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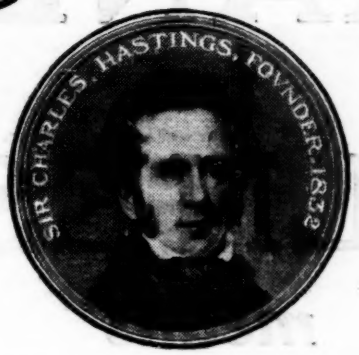

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Observations
ON
THE AUSTRALIAN FAUNA AND MEDICAL SCIENCE.

BY
WM. COLIN MacKENZIE, M.D., F.R.C.S., F.R.S.E.
(From the Australian Institute of Anatomical Research, Melbourne.)

Introduction: Functional Anatomy.

Speaking generally, the medical graduate has little concern with that department of biology which we term "applied zoology," or better, "applied comparative anatomy." Yet for the study of causation, without which no true advance can be made or principles enunciated, an intimate knowledge of applied comparative anatomy is essential, since by its means the student is brought into contact with numberless experiments on the part of Nature which are calling for explanation—experiments which represent the functional struggles through which the human body has been evolved. As we admit an evolution of structure so must we admit an evolution of function. A recognition that structure is a response to function is all-essential to those engaged in the practice of medicine.

One physiological structure does not originate another—one physiological structure does not cause the atrophy of another—as Elliot Smith has stated.[1] Both are dominated by functional needs. The teaching of zoology needs complete reorganization; it should be dominated by the needs of those whom it really most concerns—the general medical practitioner.

Functional Study in Australia.

In the Australian Commonwealth are to be found, still living in their natural state, members of the two oldest orders of mammals—namely, monotremes and marsupials, corresponding to life on this planet many millions of years ago. They are examples of living embryology. Through them man is enabled to explore his past.

In one order (Marsupialia) are to be found a carnivorous mammal with no caecum, one (koala) with a caecum 8 feet long, and one (wombat) with a vermiform appendage resembling our own. To study these mammals from the point of view not only of structure but function in relation to medical science the Australian Institute of Anatomical Research has been founded in Melbourne, and receives an annual subsidy from the Government of Victoria. The Government has also reserved at Healesville—a mountain town about forty miles from Melbourne—an area of nearly 600 acres, 80 of which have been converted into a great wire-netting cage. Here, for example, the platypus, echidna, and koala can be found living, though under observation, in their natural state. The psychology of an animal like the echidna, with its richly convoluted brain, is well worthy of study. Kinematographic records are being made to study, for example, the movements of the blue-tongued lizard, which has a small leafed cerebellum, and whose limbs are used for propulsion rather than for support, with those of the platypus, whose cerebellum is more mammalian in character and whose limbs are used for support as well as for propulsion. Unfortunately, these animals are becoming rapidly extinct, and at the request of those interested the Federal Government of Australia has recently placed an embargo on their exportation. The embargo and the Research Reservation at Healesville represent a recognition by both Federal and State Governments that this great biological field belongs primarily to the medical practitioner.

Ductless Glands: Normal or Type Structure.

In defining abnormal or pathological structure in man a knowledge of the normal or physiological is essential—in other words, we need type specimens as a basis for comparison. As the members of the Australian fauna are, like man, classified amongst mammalia, and as alcohol and syphilis need no consideration, W. J. Owen, histologist to the Institute, and I have during the past ten years been engaged on a histological investigation of all the organs of both monotremes and marsupials, so as to obtain the normal types with which human preparations could be compared. All our preparations are now available to students of histology. As an example I may cite the parathyroids. Both the British and American medical student is told that they are composed of "columns of cells," which description may mean anything. The description of fresh specimens of these in the platypus is as follows:

> "The gland is definitely lobulated—the interlobular connective tissue containing the larger vessels and nerves. The ground substance of the gland consists of a fine connective tissue reticulum with an enormous number of capillary vessels embedded in which blood cells are easily demonstrated. This capillary network is characteristic of the parathyroid gland. The secreting or epithelial cuboidal cells may be isolated or grouped; but they do not form alveoli. Colloidal material is not present."

In connexion with the ductless glandular system of the Australian mammals is to be found not only every gland so far described in man, but also glands not so far found in man. Are these glands really present in us? If not, is their absence physiological or pathological? In the monotremes we have failed to define tonsillar tissue, and in these the vocal cords are not present as in man. The tonsils are defined in the marsupial, and would appear to be associated with the evolution of the vocal cords in mammals. In the great Australian iguana the spleen is an insignificant structure swung on the mesogaster. In the "lowest" mammal, the platypus, with an increased blood temperature and the evolution of a diaphragm, the great omentum has appeared, the spleen has enormously enlarged, and its two lobes spread out in the abdominal cavity. It is of little purpose to discuss the uses of the spleen till we have solved the functional impetus that has introduced this change. The adrenals in the platypus, and especially in the carnivorous thylacinus, are relatively large organs. In the eucalyptus-leaf-eating koala and phalanger the opposite obtains. Frequently in the phalanger, and occasionally in the koala, the right adrenal may be absent. What is the cause of this disappearance? Is eucalyptus extract from the leaf taking the place of adrenal secretion? In atonic bowel conditions such as prolapse, or in disease of the adrenals, the use of eucalyptus oil would seem to be worthy of trial. Furthermore, the medullary portion of the gland in the phalanger, in contradistinction to that of man, is greater in amount than that of the cortex, and in the platypus there is neither cortical nor medullary differentiation.

The fact that the two glands corresponding to the normal thyroid in other marsupials resemble in the kangaroo and wallaby lymphoid structures will come as a surprise to most physiologists. An examination of a series of 120 fresh glands showed that it was not common to find colloidal vesicles in these structures. The structure is chiefly composed of lymphocytes, and the Institute has specimens showing a further stage of replacement in which fibrous tissue is present without lymphocytes—the whole forming an interesting study on the mode of disappearance of organs.

In these animals, to whom thyroid secretion would not appear to be an essential, we have failed to find any enlarged parathyroids. In fact, it is questionable whether they are present. If a dissection of the neck and thorax of the adult platypus be made we find (based on an examination of 80 animals) the following constant ductless glands. On each side of the commencement of the trachea is a small parathyroid. In the thorax on the right of the aortic arch is a somewhat oval body about 1 cm. long; it is present in both male and female, and is a tubular type of epithelial gland without a duct system. It was first demonstrated by W. J. Owen and myself in 1918. Owing to its close relation with the constant thymus gland we have termed the body the parathymus gland. About the origin of the great vessels from the heart is a reddish body 2 cm. long—thyroid gland—whilst spreading on the ventral surface of the pericardium is the thymus gland, often 0.5 cm. thick. This animal, like the feebly muscular Tasmanian devil, but unlike man and the strong and muscular wombat, retains a well developed thoracic thymus throughout its adult life. Surely this is the most important factor in connexion with the physiology of the thymus—its necessity to the adult platypus and Tasmanian devil, and its absence even in the pouched specimens of wombat.

In addition, the male platypus has a large pair of Cowper's glands, 2.25 cm. long, and also three other large pairs of glands not so far described in man. One of these is the crural or poison gland, the secretion of which is carried by a duct to each leg spur. Another is a vesicular gland placed in the shoulder region in both the male and female platypus. This is much larger in the male than the female, and may weigh 8 grams. Here we have been unable to demonstrate a duct

system. The third gland stretches across the back of the animal in both male and female. It is mainly salivary in character, but in addition well defined tubular ductless areas can be demonstrated. These two latter pairs of glands were described by Owen and myself in 1918. It may be truly stated that mammalian endocrinology is yet in its infancy.

The Genito-urinary System.

The prostate gland first makes its appearance in the marsupial. In this mammal it reaches its greatest development, and here its function should be studied. It is not found in either the platypus or echidna (Monotremata). In the Australian phalanger (Trichosurus) it may be 8 cm. long, 5 cm. in greatest width, and nearly 4 cm. thick. Arthur Thomson's statement that only in man does the prostate completely surround the urethra is erroneous—in fact, in the marsupial the prostate gland as such cannot be dissected from the channel contained within it.[2] The prostate is composed of glands of the compound tubulo-alveolar type with numerous columnar-cell lined ducts. In the platypus or echidna (non-prostatic) the penile urethra is a sex and not a urinary channel. In the marsupial (prostatic) the urethra is both a sex and urinary channel. The seminal vesicles have not made their appearance at this stage of mammalian evolution, which is probably explained by the existence of a breeding season. During the breeding season in both monotremes the breast tissue is well developed in the female, but in spite of the absence of development of the prostate there is no instance of mammary development in either the male platypus or echidna. In the adult platypus the testes are large, freely mobile, and intra-abdominal. In the marsupial they have escaped from the abdominal cavity, possibly to avoid dorsal fixation for a future erect position, which is already apparent in connexion with the pancreas and duodenum.

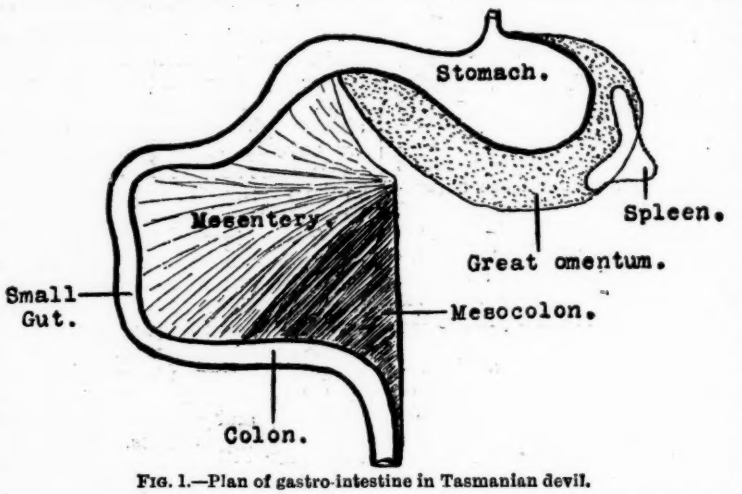

FIG. 1.—Plan of gastro-intestine in Tasmanian devil.

In the kangaroo, wombat, and koala, with well developed cremasters acting as stays over the inguinal region, the internal abdominal ring is patent, and a free communication exists from the peritoneal cavity to the tunica. In other words, the kangaroo, with comparatively lax abdominal contents and able to leap 27 feet, has a hernial sac, yet no instance of "hernia" has been recorded amongst macro-podidae. In the Tasmanian devil with a poorly developed cremaster, the internal ring is closed—Nature has cured the hernia. In the platypus a well defined pair of Cowper's glands are present, opening by a duct for each into the sex penile urethra. A pair of well developed Cowper's glands are also present in the marsupial. They are older structures than the prostate. The Cowperian secretion is poured into a sex urethra, the prostatic secretion into a urino-sex urethra. Is the almost complete disappearance of Cowper's glands in man, compared with the marsupial, physiological or pathological? In addition to Cowper's glands two pairs of large glands are also met with in the marsupial in the urethral region. They resemble in structure the shoulder glands mentioned in connexion with platypus.

A study of the female system throws light on Nature's method of unification of the Müllerian ducts, and hence on abnormalities in the female genital system. In connexion with the ovary of the wombat, especially the right, a firm distinctive body is noted externally, which on section is seen to be enclosed in a well defined fibrous capsule and presents the typical structure of a corpus luteum. This body has been found well defined at each extreme of pouch development of the embryo. There is no record of distinctive placental development in the wombat. In the Tasmanian devil there is a direct branch of the vagus into the broad ligament. What is the functional impetus that expels the embryo from the uterus within thirty days in such a powerful animal as the wombat, and necessitates placental development with prolonged retention of the human embryo? The echidna, with its richly convoluted cerebral cortex, is born in the egg stage.

THE COLON, CAECUM, AND GREAT OMENTUM.

(a) The Two Primary Types of Colon.

The mammalian colon, from the platypus up to man, may be primarily considered under two types. In one, which is best demonstrated in the Tasmanian devil, we have the whole intestine from the pylorus onwards (157 cm. long) swung on a dorsal mesentery. (Fig. 1.) Of this, 22 cm. is colon and the remainder small intestine, and at the junction of the two a well defined direct branch of the right vagus is present. The dorsal mesentery at its attachment measures 7 cm., and of this 5.5 cm. is mesocolon—that is, the peritoneal fold on which swings the colon—the remaining 1.5 cm. corresponding to the root of the mesentery, the fold on which swings the small intestine. There is no caecal development, no pyloric relationship of colon, no development of colon on the mesentery. This is the "ideal" intestinal tract of Metchnikoff and Lane.

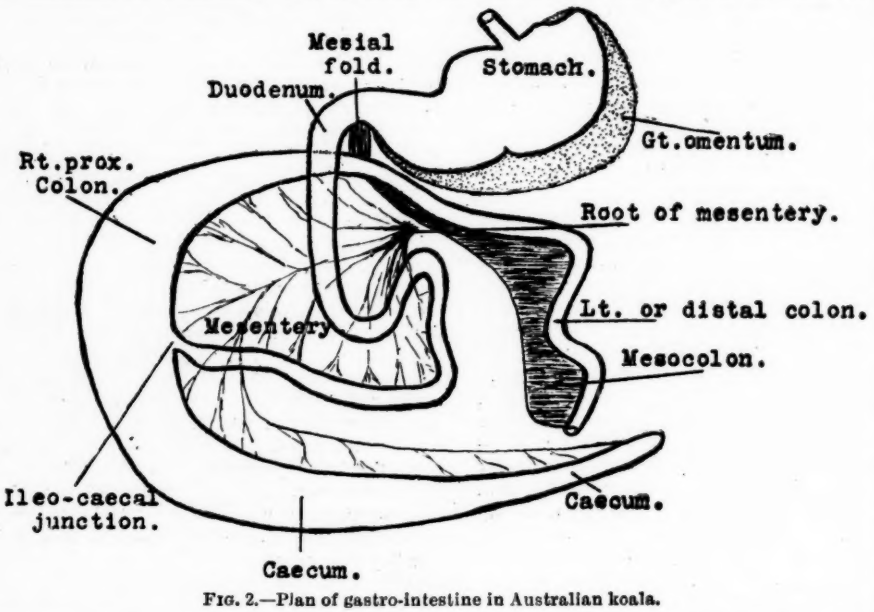

FIG. 2.—Plan of gastro-intestine in Australian koala.

In the other type, which is best demonstrated in the Australian koala, we have also the large intestine swung on its mesocolon, whose long "attachment" is traced along the dorsal abdominal wall. (Fig. 2.) In addition, however, this mesocolic or primitive colon is brought into relation with the pyloric region of the stomach by a firm band—mesial fold—1.5 cm. long and 1 cm. broad, and there is a development of a new colon (on the right of the band), which measures 150 cm. long, and a caecum which may reach 240 cm., both swung with the small intestine on the mesentery.

(b) Caecal Varieties.

From the great caecum of koala all grades of caecal development can be studied down to the appendage met with in echidna and wombat. Where we have "pyloric hitching" of colon so we have the attempt at caecal and colon development on the right. The vermiform appendage in wombat resembles that of man and the anthropoid apes, except that in some districts in Victoria it has evolved further towards complete disappearance than in man. Studies of these are interesting sidelights on the mode of disappearance of organs. The wombat is a root and vegetable eater, its diet resembling that of early man.

(c) Origin of Great Omentum or Splenic Mesentery.

In both the primary types of intestines the spleen is well developed and free, being swung on its own special fold or great omentum. These together with a complete diaphragm are mammalian characteristics. The development of great omentum (lesser sac) is primarily correlated to the relatively great splenic development seen in the "lowest" mammal (platypus) in which the right ventral process of the spleen may reach 15 cm. in length. This is in marked contrast to the insignificant spleen and absence of great omentum noted not only in the smaller lizards but in the giant iguana of Australia (Reptilia). Although in Australian mammals the lesser sac formed by the great omentum is well defined, together with Winslow's foramen, it has no connexion with the colon.

(d) Dorsal Fixation: the Erect Posture.

Compared with the intestinal mobility of koala the modifying factor to produce the arrangement seen in man has been the erect posture with its call for dorsal fixation. Experiments in simplification of the right colon towards the more human type, as first seen in lemur monkeys, can be studied in rodents. This new right colon with its large and small caeca, appendices, coils, and loops, can be well designated "the experimental colon." There are two regions from which fixation of the colon begins—namely, at the pyloric relationship (mesial fold) and in the region of the spleen. In the latter region dorsal fixation of spleen and pancreas are the initial factors, since they are connected with the colon by a fold—the left lateral—of which the lieno-renal fold in man is the remnant.

Fixation of the descending colon and sigmoid begins at the splenic region, all varieties of this being seen, and as a rule the sigmoid is not fixed dorsally, being swung on a portion of the old mesocolon. Fixation of the right, ascending, or mesenteric colon and its mesentery begins at the pyloric relationship and spreads downwards, and in man the fixation of the caecum is still incomplete.

The sequential grades of this can be studied in the lemur, platyrrhine and catarrhine monkeys, and anthropoids up to man. The fixation of the colon (part of the primitive colon with its mesocolon) between the pylorus and the spleen begins opposite the pylorus and extends to the left. This is the transverse colon of man. Fixation is effected partly by shortening of the mesocolon, but mainly by the attachment through physiological adhesions of the great omentum to the colon and mesocolon. This is the second function of the great omentum and the reason of its retention in higher types. The best animals for the study of the grades of this are kangaroo, baboon, and anthropoid apes. The transverse colon and its mesocolon are not primary boundaries of the mammalian lesser sac. They become connected with it in a purely secondary way. Much of the anatomy of the lesser sac, including the diagrams, might be conveniently forgotten.

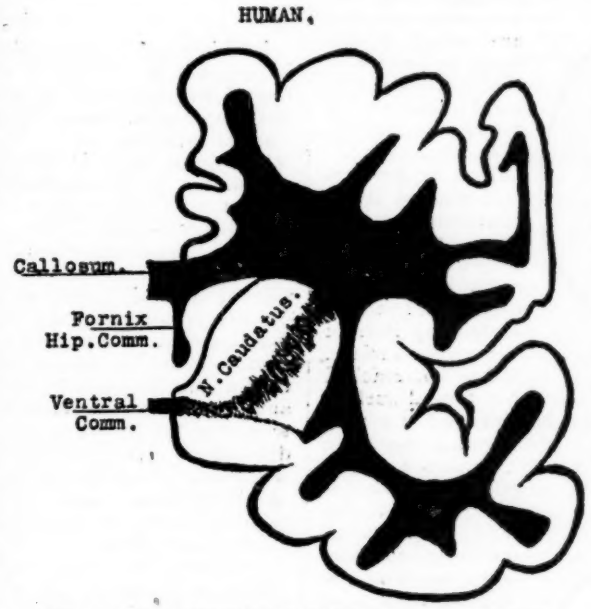

FIG. 3.—Plan of commissures in human brain. (Compare Figs. 4, 5, and 6.)

(e) The Two Parts of the Human Colon.

The human colon consists of two divisions only: (1) From the ileo-caecal region to the pyloric region, where we have a direct vagal connexion, is right, proximal, or mesenteric colon. This includes caecum and appendage, ascending colon, and hepatic flexure. It is the new or "experimental" colon. (2) From the pyloric region to the mid-sacrum in the pelvis is left, distal, or mesocolic colon. This is the old or primitive colon, and includes the portions known in man as transverse colon, splenic flexure, descending colon, iliac colon, and pelvic colon. The classification of diseases of the colon should have reference to affections of one or other division.

THE MAMMALIAN BRAIN.

A medical student attempting to learn the human brain without a knowledge of the brain of lower mammals is comparable to an architect's apprentice who receives his first lesson at Westminster Abbey instead of at a cottage. In these days of psycho-analyses and hinterlands the brain student has to remember that for practical purposes brain structure is the register of brain function. Functions, both sensory as well as motor, have followed along simple sequential paths, which can be traced. Disease destroys these functions, sensory and motor, in the reverse order.

Re-education for recovery must follow the lines of the acquisition of function. Little importance is usually paid to the human hippocampus. Compared with that of the monotremes and marsupials it is almost a relic. What functional struggle has caused so much disappearance of this structure in higher mammals? How many students associate the fornix with hippocampal disappearance? In learning the corpus callosum, which is not present in the Australian mammals, how often do we reflect on the functional impetus that has called it into being? Why is it such an important structure in man and the ventral commissure so insignificant? The functional history of these three commissures—the callosum, fornix, and ventral—is correlated to the functional history of the cerebral hemispheres in man. (Fig. 3.)

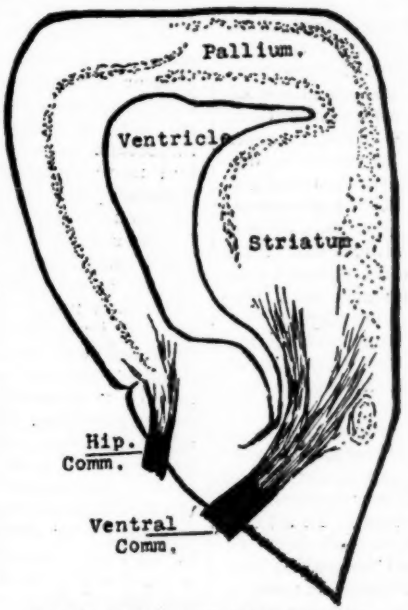

FIG. 4.—Section through brain of the Australian stump-tailed lizard.

If a transverse section be made through the brain of the Australian stump-tailed lizard (Reptilia) where the right and left portions are connected, we find that each can be regarded as a cylinder, the ventro-lateral wall of which is thickened to form the striatum or efferent ganglion. This is connected with its fellow of the opposite side by a well defined bundle — the striate or ventral commissure. The remainder of the cylinder is narrower and is connected mesially with the opposite side by the dorsal or hippocampal commissure. This portion is pallium, and the dorso-mesial portion of it is known as hippocampus. (Fig. 4.)

If a similar section be made through the brain of an Australian mammal the same plan prevails and the same commissures are present, although the ventral or striate is

much larger than the dorsal or hippocampal, and is the great connecting commissure between the two hemispheres. The striate body has increased in size, and additional cortical or projectional tissue has been added in response to functional needs, such as limb developments, into which processes from the ventral commissure are noted. A distinct process of this is traced dorsally above the hippocampus. (Fig. 5.)

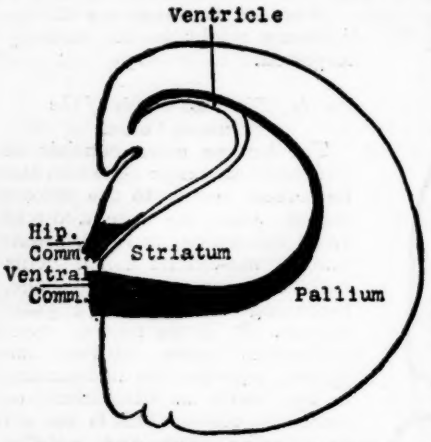

FIG. 5.—Section through brain of platypus.

This is perhaps best studied in the convoluted brain of the kangaroo, where there is only a thin layer of cortical tissue separating it from the mesial surface. It has not reached the mesial surface to join with its fellow of the opposite side to form the corpus callosum. If a similar section be made through the brain of a "higher" mammal such as the rabbit, we find a corpus callosum continuous with the ventral commissure present—the hippocampus and hippocampal or dorsal commissure are well defined, but the ventral or striate commissure has atrophied as in man. (Fig. 6.) It is now no longer the great brain commissure. The advent of the callosum in the rabbit is not associated with hippocampal atrophy. This atrophy when it occurs is not mechanical, but functional. Elliot Smith's statement that "in all mammals possessing a corpus callosum the hippocampus persists in an unchanged state only so far as the splenium of the corpus callosum" is not borne out by an examination, whether histologic or macroscopic, of the rabbit's brain. I draw attention to this because the rabbit is the mammal most frequently used for structural demonstrations to medical students. The brain of the rabbit, like that of the platypus, is devoid of convolutions; on the other hand, the brain in the echidna is richly convoluted and might be almost described as a miniature human brain. Why is there no necessity to connect the richly convoluted cortex of one side with the other in the brain of the echidna, and a necessity in the poorly developed cortex of the rabbit? Studying correlations, in the rabbit we have placental development and retention of the embryo *in utero*, whilst the echidna is an egg-laying mammal.

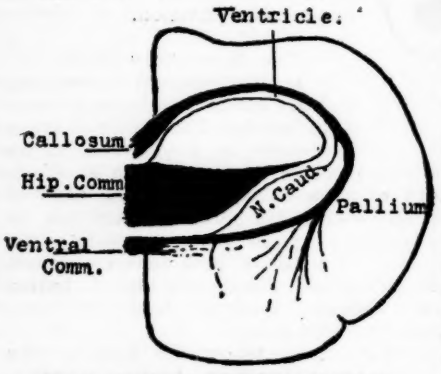

FIG. 6.—Section through brain of rabbit.

The production of the next generation is more certain in the rabbit than in the monotreme. The statement of Bainbridge and Menzies, that "the cerebral hemispheres are relatively larger in man than in any of the lower mammals," is not borne out by a study of this monotreme.[3] In all the above sections the sensory afferent ganglion or thalamus has to be divided. The necessity for functional specialization, that has resulted in its almost complete division as seen in man, has not yet arisen. The two motor striates are older than the two sensory thalami. Amongst the marsupials the thalamus reaches its greatest development in the powerful muscular wombat. Relatively the corpora quadrigemina are better developed in the marsupial than in man, though in the monotremes the posterior pair are poorly developed, as was pointed out by Meckel and Sir Richard Owen. In spite of the richly convoluted brain of the echidna its cerebellum is more primitive than that of the marsupial or higher mammals.

Nearly a century ago there was published from St. Thomas's Hospital a small volume on the brain, clinical, pathological, and physiological, based on comparative anatomy. It was the work of Samuel Solly, the friend of Astley Cooper, Charles Bell, and Marshall Hall. Through them Hunter's influence is apparent in its pages. It stands as a model of what such a work should be, and is worthy of a reissue.

CONCLUSION.

In this paper I have endeavoured to draw attention to the importance of this great biologic field and to indicate a few of the problems on which work is being conducted at the Anatomical Research Institute in connexion with the Australian fauna.

The importance is not academic but practical, and the elucidation of the numberless problems presented in monotremes and marsupials—anatomical, physiological, and pathological—must affect every department of medical science. No mention has been made of the heart, stomach, eye, larynx, or muscular system, which should all be considered from the same standpoint. As the basis of orthopaedics is muscular, and dependent on the law of muscular function that "the particular functions of any muscle are the result of the evolutionary history of that muscle," it follows that a knowledge of comparative anatomy, both structural and functional, is essential for the orthopaedic surgeon. The treatment of poliomyelitis, the greatest factor in the production of human deformity, is the immediate one, and follows definite comparative lines.

Disease is an attack on function as well as on structure—perhaps more on function. The effect on function—for example, in disease of the central nervous system such as poliomyelitis—may be out of proportion to the actual attack on structure. A cell may be capable of performing numerous functions which are not necessarily all liable to attack, or in the same proportion. Disease of an organ, interfering with its functions, does not necessarily mean interference with all its functions, and any biological system that takes no account of the evolution of function is, so far as medical practice is concerned, only a shibboleth. The teaching of zoology should be dominated by the needs of those whom it really most concerns—the general medical practitioners.

Again, the question of tissue regeneration is one concerning which we at present know very little. When an abdominal wound is closed the union is a pathologic fibrous scar, not a true regeneration of muscle, skin, and fascia. Why have skin and muscle lost this power and the uterine mucosa retained it? The lower we descend in the animal scale the greater the power of regeneration, and this is greater in cold than in warm blooded animals. The Institute has specimens in marsupials of amputation stumps (after trapping) in which the line of union is not discernible. How important for an operating surgeon to obtain a more rapid and more complete union of divided tissue! "Cure" of a diseased joint is not necessarily followed by restoration of function—the ideal.

One cannot help feeling that round the question of ductless glands lies the possible solution not only of cell stability but of cell regeneration. The empiricism that at present surrounds much of our treatment of ductless gland affections is traceable largely to the methods by which we have obtained our present knowledge—namely, the results of disease, surgical interference, and experiments on animals, not only domesticated, but taken indiscriminately from different orders. The association of the four glands in the adult platypus—namely, thyroid, thymus, parathymus, and parathyroid—is surely not without its significance, especially in the treatment of spastic affections of children, where thymus is particularly indicated. It is regretful to state that within a very short period, with increased settlement, many of our important mammals will have disappeared in spite of a rigid State protection. They vanish never to be recalled, and take their functional secrets with them.

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Observations ON THE PATHOGENICITY AND TREATMENT OF FLAGELLATE DYSENTERY.

BY

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FOR the past four years there has been a determined attempt on the part of the Ministry of Health to prevent or limit certain infectious diseases which have become a real and great danger to the community as a result of the demobilization of the services. The Public Health (Pneumonia, Malaria, Dysentery, etc.) Regulations, 1919, have made these and certain other diseases notifiable, and definite power to deal with such diseases has been given to medical officers of health.

It is with flagellate dysentery that these remarks are concerned. The definition of dysentery in Article I (1) F of the Regulations reads: "The expression 'dysentery' includes amoebic and bacillary dysentery." Other forms of dysentery such as flagellate, are not notifiable, and thus there is no attempt to safeguard the public against them.

A survey of the literature of the flagellate dysenteries leaves the mind of the reader in a turmoil as to their pathogenicity or otherwise. Few writers in the past have admitted that the presence of flagellates in the bowel is anything but a mere coincidence when found along with dysenteric symptoms. Other observers would credit only *Lamblia intestinalis* with pathogenic effects on man and still leave *Trichomonas intestinalis* and *Chilomastix mesnili* in the "mere coincidence" group. The opinions of a few authorities on the pathogenicity of *Lamblia intestinalis* may be quoted with advantage.

Hurst (1918)[1] states regarding flagellate diarrhoea: "Sometimes, however, recurrent attacks of abdominal discomfort and diarrhoea, with the passage of large quantities of yellowish mucus containing enormous numbers of active lamblia, occur; in such cases the organism is probably the cause of the symptoms. The diarrhoea, which may persist in cases of dysentery after treatment with emetine or antidysenteric serum, is probably sometimes due to additional infection with lamblia, which is not cured by these means."

In the *Memoranda on Medical Diseases in the Tropical and Subtropical War Areas*, 1919,[2] the opinion of the vast majority of workers at that date reads: "The only one which is possibly pathogenic is *Lamblia (Giardia) intestinalis*, whose habitat is the small intestine, and which is said sometimes to induce a persistent and troublesome diarrhoea."

Manson (1921)[3] states: "Lamblia infection is associated at times with a type of recurring diarrhoea accompanied with abdominal discomfort and the passage of bile-stained mucus. . . . Relapses of a periodic type tend to occur. . . . Symptoms are thought to be due to the mechanical action of the parasite. . . . Many kinds of treatment have been tried without success."

Wenyon remarks (1915)[4]: "In other cases there occur at intervals attacks of diarrhoea with the passage of mucus in which lamblia are to be found in enormous numbers, so much so that the whole microscopic field is packed with them. After recovery from such an attack the stools become normal again and only encysted forms are to be found. The occurrence of repeated attacks of this nature with a certain degree of abdominal uneasiness preceding the attacks and the passage of such extraordinary numbers of flagellates, especially in the mucus, leads one to suspect that sometimes, at any rate, *Lamblia intestinalis* may produce sufficient irritation of the small intestine to justify us in regarding it as pathogenic. The invasion of the glands of the small intestine as seen in the rabbit is suggestive of such a pathogenic rôle."

Dobell and O'Connor (1921)[5] sum up the evidence for and against the pathogenicity of the intestinal flagellates, thus: "There is as yet no good evidence to prove that any intestinal flagellate found in man is pathogenic, but that there is very considerable evidence to show that most and probably all of them are harmless."

Phillips (1915)[6] observes that "the evidence brought forward that they [faecal flagellates] are pathogenic is not very conclusive, but in the case of *Lamblia intestinalis* is more convincing." The same author quotes a large number of cases recorded by such observers as Darling, Mathis, Meyer, Fairise, and Jannin. These observers record cases of lambliasis leading to ulceration and even to perforation of the gut. One case ended fatally after perforation (Fairise and Jannin).

Except for this latter case, the general opinion, especially in the tropics, seems to be that *Lamblia intestinalis* is a harmless parasite of the bowel, or of minor pathological significance.

During the past four years there has been exceptional opportunity of thoroughly overhauling men who have returned from overseas suffering from dysentery, diarrhoea, enteritis, general debility, and neurasthenia. The failure to find any obvious reason for their unfitness led to a routine investigation of these cases. Eventually, in an endeavour to get to the bottom of all such cases, the following routine examination was adopted in the Central R.A.F. Laboratory, London:

1. Thorough clinical examination.
2. Blood culture and blood smears for parasites. Blood count and agglutination tests for indirect evidence of certain diseases, such as chronic protozoal infections, sepsis, tuberculosis, enterica, dysenterica, undulant fever, etc.
3. Wassermann reaction for syphilis.
4. Faeces examination for bacterial, protozoal, or helminthic infection.
5. Urine for albumin, blood, casts, and parasites.
6. Sputum, especially for tuberculosis.

The examination of blood films, faeces, and sputum was performed for ten consecutive days in all cases; if any part of the examination cast suspicion on the diagnosis further tests were carried out. It should be mentioned that the stools were examined as passed normally as well as after purgation with calomel and magnesium sulphate. The latter procedure ensured a good evacuation of the bowel and minimized the chance of missing parasites inhabiting the upper bowel. The whole stool was immediately sent to the laboratory, and special attention was paid to the toilet paper, because mucus was often found on this when not present in any other portion of the motion. In this manner 716 cases have been investigated, with the results shown in Table I.

TABLE I.

Organism.	Cases in which Present.	Per-centage.	Cases of Pure Infection.	Per-centage.
Entamoeba histolytica	68	10	32	5
Entamoeba coli	34	5	18	3
Iodamoeba bütschlii	30	4	12	2
Endolimax nana	6	1	2	0.3
Lamblia (Giardia) intestinalis..	57	8	22	3
Trichomonas hominis	8	1	4	0.5
Chilomastix mesnili	14	2	6	1
Tricercomonas intestinalis ...	8	1	3	0.4
Helminths	12	2	10	1
Bacillary infections	10	1	8	1
Total number of cases in which the above organisms were found in the faeces	183	26	—	—

Many of the cases showed a mixed infection of flagellates and other intestinal protozoa or helminths with other diseases, such as malaria, syphilis, and enterica. Out of 716 cases examined, one or more types of the above enumerated intestinal organisms were found in 183 instances (26 per cent.). In 117 of these only one type of organism was found. As is shown in Table I, no abnormality could be found in 35 of the cases beyond the presence of flagellates in the bowel. Thus a prolonged investigation regarding symptoms and treatment was made of 22 cases of pure lamblia infection, 4 of trichomonas, 6 of chilomastix, and 3 of tricercomonas.

PATHOGENICITY.

The pathogenicity of an organism is best studied by macroscopic and microscopic examination of the organs forming its habitat, and especially of any lesions produced. Short of this, the only method applicable is to prepare careful laboratory and clinical evidence. In "flagellosis" the opportunity of obtaining material at operation is small; the same holds good for *post-mortem* material. The writer has been forced to draw his conclusions from evidence obtained during the life of the patients.

Preparatory to discussing the symptoms of flagellosis it is well to note the chief intestinal flagellates and their habitats. They are as follows (the authority is given in parentheses):

1. *Lamblia* or *Giardia intestinalis*. Duodenum or small intestines. (Lambl, 1860.[7])
2. *Trichomonas hominis*. Large intestine and ileum. (Wenyon, 1920.[8])
3. *Chilomastix* or *Tetramitus mesnili*. Large intestine (Wenyon, 1920[8]); small intestine (Boeck, 1921[9]).
4. *Tricercomonas* or *Enteromonas hominis*. Large intestine. (Da Fonseca, 1917.[10])
5. *Embadomonas* or *Waskia intestinalis*. Large intestine to caecum. (Da Fonseca, 1917.[10])

The symptoms to which attention is drawn in flagellosis are: recurrent attacks of diarrhoea and colic, passage of mucus and perhaps blood (ulceration), thickening and tenderness of certain areas of the bowel, a blood picture showing slight leucocytosis accompanied by a distinct relative increase of the large lymphocytes with at times an eosinophilia and neurasthenia.

Dobell and O'Connor (1921)[5] state that "flagellates are found more often in persons with diarrhoea than in healthy persons for the simple reason that the stools of the healthy persons are seldom examined." A detailed examination over a period of several years of the faeces of healthy and unhealthy persons has convinced the writer that flagellates occur far more frequently in the bowel of the unhealthy than in the healthy; flagellates are not found in the faeces of more than 5 per cent. of apparently healthy persons. This means that flagellates are not normal inhabitants of the bowel.

It is agreed that the finding of an abnormal organism in the bowel of a neurasthenic person in no way proves its pathogenicity, but it is folly to explain away any abnormal symptoms that may develop in that person as nervous in origin; should an attack of diarrhoea supervene it is labelled as nervous and no attempt is made to discover the cause of the neurasthenia. As is well known, chronic infections are apt to cause a series of symptoms termed neurasthenia; should this occur a vicious circle may be set up.

No one can say that recurrent diarrhoea is a normal condition in man, nor are such flagellates as *Lamblia intestinalis*, *Tricercomonas hominis*, and *Chilomastix mesnili* normal inhabitants of the bowel. When a case of recurrent diarrhoea is subjected, as detailed above, to a careful examination for a possible cause of the malady and none is found, except the presence of some flagellate, there is at least a strong suspicion of its pathogenicity.

Most of the cases of flagellate infection recorded here had a history of recurrent diarrhoea. The stools passed by patients with a lamblia infection were often distinctive. The motions were pultaceous, pale, and had a peculiar mousy odour—quite unlike the diarrhoeic stool usually met with in Great Britain. During the past two summers, while investigating patients suffering from phlebotomus fever in Malta, some cases were noted where the premonitory symptoms of that fever were diarrhoea and colic. In practically all of these cases some intestinal protozoon was found in the faeces, while in those which did not show these symptoms such a finding was exceptional. *Lamblia intestinalis* was the protozoon most frequently found, then *Entamoeba histolytica*, and lastly *Trichomonas hominis* and *Tetramitus mesnili*. Of the total number of cases of phlebotomus fever roughly 20 per cent. showed these symptoms, associated with the presence of a protozoon in the gut. This percentage of cases of diarrhoea and colic closely coincides with that observed in phlebotomus fever by other workers[18 19].

This contention as to the pathogenicity of some flagellates is further strengthened by the frequent passage of mucus containing large numbers of flagellates. In some instances microscopic examination of this mucus showed the presence of large masses of epithelial cells amongst which were entangled numerous lamblia or other flagellates. At times some of the lamblia were seen attached by their sucking discs to these intestinal epithelial cells. Thus certain flagellates appear to exert a physical or chemical action on the intestinal mucosa. The effect may be simply an increased stimulation of the mucous glands, or a more intense action leading to epithelial desquamation or even actual ulceration of the mucosa, as is evidenced by the passage of blood mixed with the mucus. The latter condition was particularly noticed in two cases of trichomonas infection when the bloody mucus passed per rectum contained large numbers of these organisms; on palpation of the abdomen a distinct thickening of the bowel was felt in the region of the splenic flexure in both cases, and also in the sigmoid flexure of one.

Attempts have been made to ascertain the tissue invasion power of intestinal flagellates. Wenyon (1915[4] and 1920[8]) and others have made histological sections showing these flagellates filling the gland acini and invading the mucosa of the bowel. In one case at least this invasion seems to have occurred *ante mortem*. This power of invading the tissues is proved in the case of animals by the culture of a trichomonas from the blood stream of a gecko suffering from a trichomonal lesion of the intestine (Chatton, 1920).[11]

Wenyon (1920)[8] has reported the invasion of the mucosa of the whole extent of the large bowel and the lower portion of the small intestine by *Trichomonas intestinalis*. In the present series of cases the occurrence of jaundice in a patient suffering from a pure trichomonas infection points to the possibility of a higher habitat in the intestine. No other cause for the jaundice could be found. The trichomonas disappeared under the routine treatment described below. After five weeks the case relapsed; the jaundice and trichomonas returned together. The condition disappeared after a further course of treatment, and up till now, three years since treatment, there has not been any return of the jaundice, nor on periodic examination have parasites been detected.

Many of the cases of pure intestinal flagellosis investigated showed a distinct relative and absolute increase of the large lymphocytes in the peripheral blood stream. The objection so often made to the fallacy of blood counts was checked as far as possible by the fact that the blood counts of all the cases of disease and the controls were collected by a constant method, with the same instruments and between 9 and 10 a.m. daily. A point of interest was the occurrence of a varying degree of eosinophilia (5 to 8 per cent.) in some of the cases most troubled with flagellates. The percentage of eosinophiles returned to normal with the disappearance of the flagellates from the stool. Careful examination of the patients for several weeks before, during, and after treatment failed to reveal the presence of any other cause for the eosinophilia. According to Gulland and Goodall (1914)[12] intestinal irritation produces an eosinophilia. The occurrence of eosinophilia in flagellate dysentery further supports the theory of intestinal irritation in that condition.

Finally, chronic irritation of the intestinal mucosa is liable to lead to neurasthenia. This irritation may be either of a physical or chemical nature, and akin to the action of intestinal nematodes. Consider for a moment the structure and function of the intestine and its relations to the central nervous system. There is a certain store of nervous energy which is more or less the common property of the whole nervous system. This store may be drawn upon by any of the spinal, cerebellar, or cerebral arcs. Stimuli and their appropriate responses passing along these arcs gradually use up the available nervous energy. In health, sleep comes to restore this lost energy. Normally a person should start the day with 100 per cent. of nerve energy. Imagine the physical irritation set up by millions of flagellates whipping away in the gut, and, in the case of *Lamblia intestinalis*, often attached to the epithelial cells lining it, or the chemical irritation produced by the effete substances thrown off by these flagellates. By one or both of these means unconscious messages are sent along the sympathetic nerve tracts, and all night long there is a leakage of the nerve energy which should be reserved for the coming day. Depending on the degree of the physical or chemical stimuli set up, the patient may awake with only 75 or 50 per cent., or less, of the normal amount of nervous energy required for the work of the day. There is no feeling of refreshment. Work is started, and when only three-quarters or a half is done, definite signs are seen of loss of nervous energy and tone.

There is irritability and want of concentration, and any extra pressure of work causes confusion. The term "flat spin" is very appropriate whether the work is that of flying or otherwise. How often do the subjects of chronic dysentery or malaria show irritability, want of concentration, and a long train of so-called minor and unimportant symptoms. In fact the condition is glibly termed "neurasthenia." Much time is often wasted in trying to restore the nervous equilibrium, but nothing is done to cure the disease which has produced these symptoms. Work is gradually decreased in amount and quality. The whole nervous system loses tone. Vasomotor symptoms such as lassitude, flushings, syncopal attacks, giddiness, and irritability are marked.

Symptoms such as the above are serious enough on terra firma where any mental errors may be corrected by others, but their importance is increased considerably in the case of the air pilot. A little delay in the reaction time may mean a serious crash. The sooner the condition is diagnosed the more likelihood there is of a cure. The earliest manifestations of neurasthenia are readily made apparent by the elaborate modern physiological tests to which air pilots are subjected from time to time (Flack, 1920[18]). The diagnosis does not end here—the cause must be investigated, for unless efficient treatment is given a proper cure will never be attained. Enough has been said to show that any chronic disease is a great danger to health, and that the so-called non-pathogenic infection, flagellate dysentery, is really pathogenic.

TREATMENT.

Many of the cases under treatment harboured more than one type of parasite in their bowel. The habitat of these various parasites has been shown to differ, therefore an attempt was made to devise some form of treatment that would suit all or most cases of chronic protozoal or helminthic infection of the gut. With this end in view the contents of the alimentary tract were reduced to a minimum by putting the patient in bed for three days and placing him on as light a diet as possible. Thus it was hoped that more or less complete absorption of the food given would occur. At the same time sodium bicarbonate was given thrice daily in 15-grain doses. This treatment was repeated for three days, the idea being to clear away any mucus coating the internal surface of the gut, for the flagellates have been proved to be frequently embedded in the gland acini of the intestine. The clearing of mucus from around the head of any helminths present was also attained in this manner. In order to clear the intestines further of their contents and thus allow the specific drugs to exercise their maximum effect on the parasites lodged in the wall of the gut, a 3-grain dose of calomel was given at bedtime on the third day, and 2 drachms of magnesium sulphate administered at 8 o'clock the following morning. When the bowels had moved thymol was given in three 30-grain doses. This was given in cachets (15 grains in each cachet was found to be a convenient amount to swallow), two cachets hourly for three consecutive hours—usually at 9, 10, and 11 a.m. At 12 noon a further dose of magnesium sulphate was given to clear the bowel of the excess of thymol and diminish the risk of thymol poisoning. No food or drink was allowed from bedtime the previous evening until the thymol treatment had been completed. When the bowels had operated actively after the second dose of salts, a cup of tea without milk and a piece of dry toast was given. At tea-time an ordinary plain tea was allowed and chicken diet for dinner. At bedtime that evening emetine bismuthous iodide powder (E.B.I.), 1 grain in a gelatin capsule, was given, the following evening E.B.I. 2 grains, and thereafter for ten consecutive days the dose was increased to 3 grains. Thus a total of 33 grains of E.B.I. was administered.

During the fortnight following the thymol treatment high lavage of the colon was performed on alternate mornings with a solution of quinine sulphate in water (10 to 20 grains of quinine to the pint). For this purpose a rubber catheter was inserted into the rectum for a distance of ten to twelve inches and the quinine solution (1½ to 2 pints) run in gently by gravitation. The patient lay on the left side during the administration, and on withdrawal of the catheter was requested to lie flat on his back for five minutes, thereafter on the right side for another five minutes. In this manner a good lavage of the colon was obtained. This lavage was found most valuable in clearing away lumps of mucus containing large numbers of free forms of trichomonas and chilomastix. (Such lumps of mucus are often held up by the folds of the large intestine.) The rapid removal of large numbers of free flagellates must materially aid their final eradication by reducing the number of proliferating organisms.

After this course of emetine bismuthous iodide the stools were examined daily for at least three weeks, a purge being given at least once a week, and if the findings were negative during that period the patient was encouraged to lead a normal life, alcohol not being forbidden. If there was no return of the intestinal parasites during the next three days the patient was discharged from hospital and put on a tonic pill containing iron, arsenic, strychnine, and cascara. Monthly examinations of the stool were done for three or four months after discharge from hospital.

In the case of relapses an interval of seven to ten days was allowed after the first course of E.B.I. before a second course of thymol and E.B.I. was administered. During the interval salol, 10 grains, was given thrice daily to act as an intestinal antiseptic. In a few cases of lamblia infection salol had a distinctly beneficial action.

Only in a few cases was a third course of treatment given, as it was found that those cases which did not respond to the above treatment were practically incurable. These cases were put on salol, 10 grains thrice daily for a fortnight every month, and given colon lavage twice weekly. This treatment was continued for three months, the patient meanwhile doing light duty.

The results of the above treatment have been very satisfactory. At least 50 per cent. of lamblia infections have been cleared up according to the standards laid down, all the trichomonas cases except one have recovered, and two of the chilomastix cases have relapsed. (See also Barlow, 1916.[14]) This strenuous treatment has given results very comparable to those of E.B.I. in *Entamoeba histolytica* infections. In this latter infection, under the systematic lines of treatment laid down by Dale,[15 16] Low,[17] and Dobell,[5] quite a number of chronic cystic carriers fail to clear up; the percentage of cures is certainly less than 75. Dobell and O'Connor (1921)[5] criticize the treatment of flagellate dysentery thus: "The appearance of flagellates or their cysts in the stools of infected persons is frequently very irregular. We have numerous records showing that the stools of infected persons may be 'negative,' on microscopic examination, for considerable periods of time; and this is true of persons undergoing no treatment whatsoever." This statement is admitted, but it applies with equal force to infection with *Entamoeba histolytica*.

During 1918, in conjunction with Major O. H. Gotch, late R.A.F. Medical Service, twelve cases of protozoal infection of the gut (*Entamoeba histolytica*, trichomonas, and lamblia) were treated with novarsenobillon ("914"). The drug was administered intravenously, and a series of four to six injections given in each case. The first dose was 0.45 gram, the second 0.6 gram, and the remaining doses 0.75 gram. In no case was there any improvement of the intestinal condition.

CONCLUSIONS.

The object of this paper is to emphasize the following points:

1. Flagellate dysentery is a *pathogenic condition* which, if allowed to persist, will eventually undermine the health of the patient and cause neurasthenia.

2. Certain cases are simply "carriers," as are some cases of *Entamoeba histolytica* infection. This in no way proves their non-pathogenicity. Such "carriers" are a great source of danger, inasmuch as they may infect others, especially in a military service where they are likely to be drafted overseas.

3. Contrary to what is usually stated, flagellate dysentery may be *cured* in at least 50 per cent. of cases. Stress is laid upon the advisability of the combined treatment by purgation, thymol, emetine bismuthous iodide, and lavage of the colon.

4. All cases of recurrent diarrhoea or neurasthenia for which no cause can be found, and in whom flagellates can be detected in the stools, should have a course of treatment as outlined above.

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EFFECTS OF EXCESS OF CALCIUM ON THE SKELETON.

BY

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(From the Department of Experimental Pathology, Lister Institute.)

In my previous communications (1921–22) I determined the influence of a normal diet (N diet) or a diet deficient in fat-soluble factor (—A diet) upon the composition and structure of the skeleton of rats. These diets contained 0.25 to 0.26 per cent. Ca (about 0.4 per cent. in air-dry diet). This amount of calcium was acknowledged to be sufficient but not excessive, being rather near to the border-line of the physiological requirements of the organism.

There is a form of rickets induced solely by a deficiency of calcium in the diet—"rickets from calcium starvation." This is completely cured by the addition of calcium salts to the diet. Other forms of rickets develop on diets containing a sufficient amount of calcium, and the ingestion of even excessive amounts of lime salts is not usually followed by a complete cure. In Orgler's (1911) opinion the increased introduction of calcium is useless, as the capacity to deposit calcium in the bones is lost during the active stage of the disease. Grosser (1920), however, found that considerable retention occurred in rickety children when the calcium was introduced subcutaneously in the form of a glycerophosphate.

The question is, to which of these two groups of rickets do the affections of the skeleton, obtained by me (1921–22) in rats by means of —A diet, belong? It is also an interesting question whether, and to what extent, it is possible to increase the calcium content of the skeleton of a normal animal kept on the normal (N) diet used by me by the ingestion of large quantities of calcium.

For the purpose of solving these questions I conducted seven experiments. They were conducted on 39 rats, belonging to seven litters. The technique of the experiments was, on the whole, similar to that used by me in my previous experiments. The rats were fed on the same basal diets: (1) normal (N), containing a liberal amount of fat-soluble factor; (2) deficient in this factor (—A). The different conditions introduced into the present experiments, and clearly seen from Table I, were as follows: (1) In diets N 2, N 3, —A 2, —A 3, the amount of calcium was increased by the addition of $CaCO_3$, and (2) the normal diet of some rats contained as the source of fat-soluble factor butter only, without any cod-liver oil (N B).

TABLE I.

Diet.	Percentage of Fat in Fresh Diet.	Amount of Calcium in Fresh Paste.	Amount of Calcium in Air-dry Diet.
		Per cent.	Per cent.
NB	11 per cent. butter	0.26	0.4
N 1	8 per cent. butter + 2 per cent. cod-liver oil	0.25	0.4
N 2	Ditto	0.52	0.8
N 3	Ditto	0.77	1.18
—A 1	10 per cent. cottonseed oil (no fat-soluble factor)	0.26	0.4
—A 2	Ditto	0.52	0.8
—A 3	Ditto	0.77	1.18

In all of the above diets about 0.5–0.51 per cent. phosphorus was present in fresh paste and about 0.77 per cent. phosphorus in the air-dry diet. The amount of calcium in the different diets was determined by McCrudden's method, that of phosphorus by A. Neumann's method. Shipley, Park, McCollum, Simmonds, and Kinney (1922) consider the optimum calcium content in air-dry diet about 0.67 per cent.; in their opinion, about 0.4 per cent. phosphorus represents the minimal content on which optimal development can take place. For comparison with the figures of these authors, my figures in Table I, "in air-dry diet," should be used.

Details of the experiments are shown in Tables II to V. The average consumption of food per diem by the different litters of rats was as follows:

	NB.	N 1.	N 2.	N 3.	—A 1.	—A 2.	—A 3.
	grm.	grm.	grm.	grm.	grm.	grm.	grm.
Litter 638	—	17	17.5	20	—	—	—
Litter 640	—	24	18	—	—	—	—
Litters A, B, C	15	18	16	15	10	12	11
Litter 689	—	—	—	—	—	—	6-7
Litter of rats 701–705 ...	—	—	—	—	11.5	13	14

In some cases it was observed that the average consumption was greater when the food contained a greater amount of calcium.

Results of Chemical Investigation.

An examination of the figures in Tables II to VI shows the following:

TABLE II.

Changes in the skeleton of two litters (638 and 640) of rats kept on normal diets. Litters 638 and 640 aged at the beginning of diet 39 and 49 days respectively; final age, 101 and 110 days; duration of feeding, 61 days.

No. of Rat.	Diet.	In Dry Bone.	No. of Rat.	Diet.	In Dry Bone.
		Ca %			Ca %
638 A... ...	N 1	22.0	638 D... ...	N 2	23.5
638 B... ...	,,	22.8	638 E... ...	,,	23.7
640 A... ...	,,	22.3	638 H... ...	,,	22.8
			640 B... ...	,,	22.0
Average ..		22.4			
638 G... ...	N 3	23.6	Average ...		23.0
638 K... ...	,,	22.8			
Average ...		23.2			

TABLE III.

Changes in the skeleton of three litters (A, B, and C) of rats kept on normal diets. Litters A, B, and C when put on diets, aged 22, 24, and 26 days respectively; final age—82, 84, and 86 days; duration of feeding—60 days.

No. of Rat.	Diet.	In Dry Bone.	No. of Rat.	Diet.	In Dry Bone.
		Ca %			Ca%
668 A... ...	NB	21.3	666 A... ...	N 2	21.2
675 B... ...	,,	21.3	673 B... ...	,,	21.4
682 C... ...	,,	21.3	680 C... ...	,,	21.6
Average ...		21.3	Average ...		21.4
655 A... ...	N 1	21.2	667 A... ...	N 3	22.6
672 B... ...	,,	21.4	674 B... ...	,,	21.4
686 C... ...	,,	21.7	681 C... ...	,,	22.5
Average ...		21.4	Average ...		22.2

TABLE IV.

Changes in the skeleton of rats taken from the same three litters, shown in Table No. 3 but kept on —A diet.

No. of Rat.	Diet.	In Dry Bone.	No. of Rat.	Diet.	In Dry Bone.
		Ca%			Ca%
669 A... ...	—A 1	11.2	671 A... ...	—A 3	18.1
676 B... ...	,,	15.8	678 B... ...	,,	14.2
683 C... ...	,,	14.8	685 C... ...	,,	15.5
Average ...		13.9	Average ...		15.9
670 A... ...	—A 2	16.7			
677 B... ...	,,	17.7			
684 C... ...	,,	15.3			
Average ...		16.6			

TABLE V.

Changes in the skeleton of rats 701–705, kept on −A diet. Litter, when put on diet, aged 27 days; final age, 65 days. Duration of feeding, 49 days.

No. of Rat.	Diet.	In Dry Bone.	No. of Rat.	Diet.	In Dry Bone.
		Ca %			Ca %
Normal rats of same age	N 1	20.5	703	−A 2	18.7
701	−A 1	16.9	704	−A 2	17.7
702	−A 1	16.9	Average		18.2
Average ...		16.9	705	−A 3	17.5

TABLE VI.

Changes in the skeleton of litter 689 of rats kept on −A 3 diet. Litter 689, when put on −A 3 diet, aged 24 days; final age, 65 days; duration of feeding, 41 days. Mother kept on the same diet −A 3 during lactation.

No. of Rat.	Diet.	In Dry Bone.
		Ca %
Normal rats of the same age ...	N 1	20.4
689 C	−A 3	13.2
„ D	„	14.2
„ E	„	12.5
„ F	„	12.8
Average		13.2

Normal Diet NB, without Cod-liver Oil.—As is seen from Table III, when butter alone was used as a fat-soluble factor in the diet, and when the calcium content in fresh diet reached about 0.26 per cent., the calcification of the skeleton did not differ from that in rats fed on the same diet but with cod-liver oil substituted for part of the butter ration. The result was the same even when the calcium content in the latter diet was doubled (N 2 diet, see Table III). That is to say, some samples of butter, *even when bought in winter*, may contain such an amount of the antirachitic principle that even the addition of cod-liver oil to the diet does not increase the calcification of the skeleton.

Normal Diets, N 1, N 2, and N 3, with Cod-liver Oil (Tables II and III).—In these normal diets, containing butter and cod-liver oil as sources of the fat-soluble factor, the increase to double (N 2) or treble the amount (N 3) resulted either in no increase whatever in the calcium content of the skeleton, or in the calcification of the latter being increased very slightly (within the limits of physiological fluctuations).

Diets Deficient in the Fat-soluble Factor.—Among all the rats fed on such diets there was not a single case where the increase of calcium from 0.4 per cent. (in air-dry diet) to 0.8 per cent. (−A 2 diet), and even to about 1.2 per cent. (−A 3 diet), could restore the calcium content of the skeleton to the normal.

A great increase of calcium in the skeleton, in connexion with its increased content in the diet, was observed only in one litter (A, Table IV); but even in this case, as compared with the corresponding normal rat 667 A, in rat 671 A (on −A 3 diet) the calcium content of the skeleton was 27 per cent. less in fresh bone and 16 per cent. in dry. I came across a similar decrease in the calcification of the skeleton of rats kept on −A diet in other experiments (Korenchevsky, 1922, 3, p. 83). In another rat (670 A) from the same litter A, the calcium deficiency in the skeleton as compared with the normal rat 666 A was still more marked, being 31 per cent. (fresh bone) and 21 per cent. (dry bone). Besides this, in connexion with litter A it is necessary to mention the following. This litter was obtained from a dealer, and not reared in the Lister Institute, as was usually the case in my experiments. The diet of the mother rat during lactation, and of the young until weaned, was deficient in calcium (kitchen refuse, bread). This would explain the low calcium content of the skeleton of rat 669 (Table IV) of this litter on −A diet, such as I have never observed in rats fed on a normal diet during lactation, and which occurs only when the mother's diet during lactation is deficient in calcium or fat-soluble factor (Korenchevsky, 1922, C). In that case it is quite comprehensible that the ingestion of larger quantities of calcium caused a more rapid increase in the calcium content of the skeleton to the level observed in rats on −A diet. The special experiment conducted by me and described elsewhere (1922, C, pp. 105–108) shows this very clearly.

In the case of four rats (677, 678, 684, 685) of litters B and C (Table IV), with an increased amount of calcium in the diet −A 2 and −A 3, the fluctuations of the calcium content in the skeleton kept within limits frequently observed in different rats of the same litter. For instance, in rat 678 on −A 3—that is, with the greatest amount of calcium—the calcium content in the skeleton was lower than that of rats 676 and 677 of the same litter, fed on −A 1 and −A 2 diets respectively.

In litter of rats 701 to 705 (Table V) there was slight increase in the calcium content of the skeleton of rats kept on −A 2 and −A 3 diets as compared with that of rats kept on −A 1 diet. These rats were born from a rat kept during pregnancy and lactation on a diet rich in fat-soluble factor. Therefore, owing to a congenital store of fat-soluble factor in their bodies they continued to grow fairly well, notwithstanding −A diet during the experiment. On autopsy they were found to be fat, well nourished, and with no signs of any macroscopical lesions in the skeleton. It is possible to suggest that some amount of fat-soluble factor, stored in the body of these rats, had enabled them to assimilate a larger, *although not normal*, amount of calcium when fed on diets containing an excess of calcium.

In contrast to this experiment was a cross experiment with litter 689 (Table VI) in whom the storage of fat-soluble factor was reduced to a minimum by feeding their mother rat during lactation on diet deficient in this factor, although rich in calcium (−A 3 diet). Notwithstanding the presence of an excess of calcium in diet −A 3 the calcium content of the skeleton of litter 689 was strikingly decreased (about 50 per cent. in fresh bone and about 35 per cent. in dry bone, below normal).

These two experiments indicate that even in the case of abnormally lowered calcium assimilation in rats kept on diets deficient in fat-soluble factor the degree of this assimilation depends upon a more or less complete exhaustion of the fat-soluble factor in the organism. Apparently an excess of calcium in the diet could be followed by slightly increased, *although far from normal*, assimilation of calcium, if the fat-soluble factor is not completely exhausted in the organism.

Histological Results.

Histological structure of the skeleton of rats kept on N B, N 1, N 2, and N 3 diets was normal and similar in all cases. I have mentioned in my previous communications that the ribs of rats kept on N 1 diet sometimes show slight concave flexure of the costo-chondral junction. I have observed this same feature in the ribs of some rats kept on normal diets containing a double or treble amount of calcium. Rat 682 on NB diet, which contained the smallest amount of calcium and no cod-liver oil, showed the most classical picture of normal skeleton.

In the experiments with litters A, B, and C (Table IV) the structure of the skeleton of rats on −A 2 diet was similar to that of rats kept on −A 1 diet. I described this picture several times. In rats of the same litters, kept on −A 3 diet, the histological changes in the bones were less pronounced, but these changes always vary on −A diet. In any case, the double amount of calcium (corresponding to McCollum's optimum amount of calcium in rat's food) had no influence on the structure of the skeleton. In these experiments histological changes in the bones of litters A, B, and C were found to be typical of *late* rickets—that is, without increase of the proliferating cartilage with some osteoporosis. This type of late rickets, slight or very slight, was also found in rats 701 to 705 (Table V). In litter 689 (Table VI), kept on −A 3 diet, but with an exhausted store of fat-soluble factor, moderately severe rickets was found. In these rats proliferating cartilage was two to four times more than normally increased, calcium deposition in the zone of provisional calcification was deficient, and the bones were as well osteoporotic. Therefore, the results of histological investigation were completely analogous to those of the chemical analysis and showed the importance of the exhaustion of fat-soluble factor from the organism in the development of rickets.

On the basis of the results of the experiments described above I think it possible to draw the following conclusions:

1. Butter bought in winter may contain a considerable amount of the antirachitic principle.

2. When the amount of calcium in a normal diet containing 8 per cent. butter and 2 per cent. cod-liver oil was increased

two or three times the calcification of the skeleton was either not increased at all or only slightly.

3. The ingestion of even very large quantities of calcium did not cure the rachitic calcium impoverishment of the skeleton of rats on a diet deficient in the fat-soluble factor.

4. When the exhaustion of the fat-soluble factor in the body of rats is not complete, an excess of calcium in diets deficient in fat-soluble factor may in some cases slightly increase the amount of calcium in the skeleton, though never sufficient to make the calcification normal.

5. On the basis of the data of the chemical and histological examination, the skeletal affections in rats on —A diet must be classed in the group of rachitic affections, which develop even with an excess of calcium in the diet.

The grant of the Medical Research Council and the hospitality of the laboratories of the Lister Institute have enabled me to carry out this work, and to them my thanks are due. I wish also to express my sincere gratitude to Professor C. J. Martin for his continuous support in this investigation, and to Miss M. Carr for her assistance in chemical analyses.

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INTUSSUSCEPTION SUPERVENING ON CONGENITAL STENOSIS OF THE ILEUM.

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CASES of intussusception as the result of congenital constriction of the small intestine form a group often emphasized in textbooks, but records of such cases are comparatively infrequent. In a series of 400 cases of intussusception at the London Hospital, Perrin and Lindsay[1] found only two due to this cause. According to Leichtenstern[2] intussusception as a result of congenital stricture is uncommon, as the dilated hypertrophied proximal segment is not easily invaginated into the small empty distal portion. The following case, therefore, seems of sufficient interest to record. I am indebted to the late Mr. T. H. Kellock for permission to publish it.

A boy aged 11 years returned home from school on June 30th, 1922, complaining of pains in the abdomen; administration of castor oil was followed by vomiting; the sickness and pain continued throughout the night; next day the vomiting ceased though the pain persisted, becoming more severe at night. His condition became progressively worse, vomiting recurred, and he was admitted to the Middlesex Hospital on July 3rd. He was a tall thin boy of poor muscular development; his face was pale, drawn, and anxious, the tongue dry and furred, the lips and teeth were crusted. The temperature was 97°, pulse 124, respirations 28. The abdomen was distended and tender, especially in the lower part, and showed no movement on respiration. In the centre of the lower part of the abdomen was an indefinite swelling dull to percussion. No note was made as to visible peristalsis.

The specimen removed at operation. (From a drawing by Miss D. Clephan.) The outer and middle layers of the intussusception have been opened up to show the congenital constriction, A, in position. The most advanced point, B, shows a rounded nodule projecting on the peritoneal surface; this on section consisted of blood clot. C, ulcerated or gangrenous portion of the outer layer.

Operation (by Mr. Kellock).

A right paramedial incision, 4 inches long, was made below the level of the umbilicus. The peritoneum was injected, and the cavity contained much blood-stained fluid. The distended and engorged small intestine which presented was followed down until the cause of the obstruction was reached in the lower ileum. This proved to be an intussusception. The greater part of it was reduced, but a portion some 4 inches long was irreducible, and showed gangrenous patches. Resection of this part was performed, and, as the patient's condition was bad, anastomosis was effected by a Murphy's button. The abdomen was closed except for a small gauze drain.

On the evening of that day the temperature rose to 99.4°, the pulse and respiration rate being 140 and 28. His condition remained critical for some days. Removal of the gauze drain on the fifth day released a discharge with faecal odour. By the eighth day the general condition showed slight improvement, but a fistula, freely discharging intestinal contents, had developed. The Murphy's button was not recovered until the twenty-eighth day. The escape of intestinal contents slowly diminished and the surrounding skin, which had been reddened and excoriated, began to heal.

The patient was discharged to a convalescent home seven weeks after the operation, with the fistula practically closed. His general condition was very satisfactory. He is now completely recovered, has put on weight, and looks robust and well.

The Specimen.

Examination of the specimen removed showed a pure enteric intussusception. When the two outer coats were divided longitudinally it was found that the intussusception had commenced by the invagination of a portion which was the seat of a congenital stricture into the part below. The stricture was over 2 inches in length, and the lumen of the gut at its narrowest part was not more than an eighth of an inch in diameter. The wall of the gut at the stricture is not much thickened, the external diameter being about a quarter of an inch. A nodule about the size of a hazel nut, which was incorporated in the wall of the gut, appeared to be the most advanced point of the entering layer; it was an effusion of blood into the tissues, probably secondary to the intussusception.

The whole specimen showed the congestion and ulceration usual in cases of intussusception of some days' standing.

The different ways in which a marked congenital stricture of the ileum may affect the life and health of an individual are well shown in the notes on three specimens in the Middlesex Hospital museum. Bland-Sutton,[3] who applies the name "imperforate ileum" to such deformities, has illustrated two of the specimens in his article in the *American Journal of the Medical Sciences* and in his book on tumours. In the first specimen, which shows the condition to which he gives the name "septate ileum," the lumen is interrupted 36 inches above the ileo-caecal valve by a perforated diaphragm which reduces the diameter of the channel to a quarter of an inch. Externally a slight constriction marks its site. This septum had caused no symptoms, and was found *post mortem* in a man, aged 62, who had died from myocarditis and emphysema. The second specimen shows complete interruption of the ileum in an infant; the patient was under the care of Sir John Bland-Sutton, who diagnosed the condition and operated; death occurred, as it almost invariably does. Only two cases are recorded in which an infant with complete stenosis in this region has recovered. In both of these the lesion was single, and it was possible to perform entero-anastomosis. When the condition is multiple death has so far invariably been the result. In many cases, according to Clogg,[4] even where the lesion is single, the lumen beyond the occlusion is either blocked with inspissated mucus or so narrow that the passage of meconium along it is still prevented.

The third specimen, recorded by Leopold Hudson,[5] was obtained *post mortem* from a boy aged 8, who died of peritonitis; until twelve months previous to his death the boy had been perfectly healthy and free from abdominal trouble. The specimen shows a segment of gut situated 38 inches above the ileo-caecal valve, so narrow for a length of three-quarters of an inch that it barely admitted a probe. This stenosed segment connected a hypertrophied and distended proximal portion of small intestine with a distal part apparently normal. A small perforation had occurred just above the narrow segment, causing a fatal result. The autopsy revealed an intussusception considered agonal in nature, formed by the invagination of the upper loop into the lower for a distance of approximately 2 inches.

Sir Arthur Keith[6] collected and grouped specimens of constrictions and occlusions of the alimentary tract of congenital

or obscure origin found in the museums of the Royal College of Surgeons and various medical schools. The total number of specimens was 86: the jejunum or ileum was affected in 15 (those having an associated Meckel's diverticulum were not included). Sir John Bland-Sutton has found that these stenosing abnormalities of the ileum are associated with the obliteration of the stalk of the yolk sac, and are sometimes complicated by a persistent Meckel's diverticulum.

Keith also collected from the same museums a total of 95 cases of Meckel's diverticulum, in 27 of which marked constriction or narrowing was found in the neighbourhood of this abnormal structure. The constrictions were of two kinds—those due to pressure or traction of the mesentery of the diverticulum as it crossed the ileum, and those due to irregular growth or expansion of the Meckelian loop of the ileum, the last part of the ileum to be differentiated off from the yolk sac. Of the 95 preparations, intussusception was present in 3, but whether any of these were due to constriction, as distinct from the diverticulum, is not stated.

Meckel's diverticulum is said to be present in 2 per cent. of all individuals. Since the rarer specimens showing a secondary lesion are likely to have been preserved at the expense of the more common ones, it would appear that intussusception associated with Meckel's diverticulum is somewhat rare. In the collection of Perrin and Lindsay, enteric intussusceptions form less than 7 per cent. of the total, and Meckel's diverticulum is responsible for 5 of these.

Bland-Sutton has pointed out how often congenital constrictions are found where embryonic diverticula occur. In the duodenum the common congenital occlusion is caused by a septum just above the entry of the bile duct, and is probably associated with the outgrowth of the embryonic buds of the liver and pancreas. In this situation, therefore, it occurs at the junction of the two different morphological parts of the alimentary tract, the foregut and midgut. In the ileum, stricture occurs most commonly in close relation to the site of a Meckel's diverticulum. It is not easy to see how this explanation accounts for all the occlusions of the ileo-jejunal segment.

The following cases illustrate the varieties of deformity that may occur in that region:

Keith's series include 3 cases of multiple stenosis (in 2 the jejunum was affected, in 1 the ileum), 1 case of complete occlusion just above the ileo-caecal valve, and 1 case in which continuity was interrupted just at the valve. In the 6 other cases of jejunal stricture of his series the deformity varied from local narrowing to complete absence of a segment of gut and mesentery.

Rock Carling[7] records a case of stricture just below the duodeno-jejunal flexure. Morley[8] describes a case of occlusion at the ileo-caecal valve.

The theories advanced in explanation of the strictures have been admirably expounded by Clogg, but the more important points may be recalled.

1. *Relation to Diverticula.*

Meckel's diverticulum can, according to Leichtenstern, occur at varying points along the jejunum and ileum. He gives cases in which a single diverticulum has been found near the mid-point of the ileum, at the ileo-jejunal junction, and even in the jejunum. Crymble[9] records a case of persistent vitelline duct connected with the appendix. Lamb[10] records cases where diverticula were seen in the jejunum (14 cases) and in the duodenum (7 cases).

More recent authorities state, however, that many true diverticula in the upper part of the ileo-jejunal segment are associated with accessory pancreatic buds. The relation of these diverticula to stenoses and occlusions has not yet been worked out. It is possible that, as in the development of the normal pancreatic buds, conditions which permit the formation of septa may be present. However, I can find no reported cases of developmental septa or constrictions in relation to such diverticula.

2. *Relation to Proliferation of Mucous Membrane.*

Tandler,[11] who first pointed out that the duodenal lumen in the human embryo of 30 to 60 days is more or less completely obliterated by proliferated epithelium, suggests that a similar epithelial occlusion may exceptionally be found in all parts of the embryonic intestine. Keibel,[12] in an embryo of 11.5 mm., found that the epithelium of the lower part of the intestines blocked the lumen in two places, but did not observe similar conditions in other specimens.

Although occlusion by septa, and even narrowing of the gut, might be accounted for by the persistence of this obliteration of the lumen, it is not easy to attribute absence of a segment or absence of the mesentery to this cause. The narrowing which occurs in the duodenum when a septum is present merely indicates that development has stopped at an early period, without explaining the cause.

3. *Failure in Evolution of the Intestinal Tract.*

The jejunum, ileum, and proximal part of the colon are all developed from that portion of the midgut which overlies the yolk sac in embryos up to the end of the third week. It is possible, therefore, that strictures are brought about by irregular closing of this portion, but if such irregularities occurred, congenital dilatation of this segment might be expected to exist more commonly. It seems more likely that strictures arise during the subsequent elongation of the midgut and hindgut. Certainly irregularities occur in this process.

In Abernethy's case of a boy aged 12 the small bowel was only 2 feet in length, while the colon measured 4 feet.

Sir Alexander MacCormick[13] reports a still more remarkable case of a well developed man of 28 who had always had good health except for periodic attacks of vomiting. At an exploratory operation the stomach was found to fill the entire abdominal cavity, and to reach down to the pelvis. The small intestine was represented by a short segment 6 inches long, reaching from the duodeno-jejunal flexure to a caecum situated in the left hypochondriac region. No appendix was found, and a modified colon followed the course of the portion of the normal large intestine distal to the splenic flexure.

Failure in development of a small segment would give all varieties of stricture from mere narrowing to complete absence of a portion of gut with its mesentery. Certain factors have to be considered in relation to this lack of development.

(*a*) *Vascular Anomalies.*—Arrest of growth of the intestines, according to Jaboulay, depends upon vascular lesions—for example, embolism and thrombosis of the mesenteric vessels. It is easy to see that such lesions would cause such abnormalities, but proof of the statement is difficult. The same effect might be produced by congenital vascular defects, by dragging on the vessels by adhesions, or by pressure of tumours upon them. Davis and Poynter[15] found small lumina and sclerosis in the arteries of the segments affected in a case of multiple atresia of the jejunum.

(*b*) *Peritonitis* has been widely accepted as a cause of congenital stricture. Tubercle and syphilis provide the majority of such cases, but other forms are said to exist. The focal effect necessary for the production of single stenosis (the commonest type) is unusual in any such infection of the peritoneum.

4. *Mechanical Causes.*

(*a*) *Blocking of the lumen* by means of mucous plugs has been described as a cause of intestinal obstruction in infants, sometimes in relation to narrowing of the lumen, sometimes with a normal lumen. Its occurrence is rare, and the condition has little or no claim to consideration as a general cause of stricture.

(*b*) *Adhesions* formed in development or as a result of peritonitis are said to cause congenital strictures, either by compression of the gut by bands or by dragging on the vessels of the mesentery. They may also initiate a volvulus.

(*c*) *Volvulus* is believed to account for some cases. Morley attributes his own case to this cause, and suggests that it may explain Waterston's[14] case also.

It must be remembered that the intestines undergo a complete counter-clockwise turn in passing from the foetal to the adult position. The stalk of the vitelline duct has usually disappeared before rotation commences. If, however, involution of the duct fails, so that attachment to the umbilicus persists, the possibility of a clockwise strain at the point of attachment of Meckel's diverticulum must be borne in mind. A specimen of a Meckel's diverticulum retaining its umbilical attachment is illustrated by Evans.[17] The same possibility is present whenever a peritoneal band attaches the foetal gut to the anterior abdominal wall at an early stage. The question arises as to whether a case of multiple congenital stricture may have arisen from multiple volvuli.

Volvulus, when present, is usually clockwise, but many turns are present. It may be that it is a continuation of the process started as above, but there is no proof of such an origin. It may equally well have arisen in a more haphazard way at an early stage, or the volvulus may be a secondary factor in a gut already the subject of atresia.

The theory that congenital constrictions arise from torsion might account for those cases in which there is irregularity

or absence of the mesentery; it does not, however, account for those specimens which show mere narrowing, but no suggestion of torsion, and no disturbance of an orderly vascular arrangement. It can only play an occasional part in the formation of intestinal abnormalities.

(*d*) *Intussusception* was undoubtedly present in the constricted portions found in the cases examined by Braun and Chiari,[16] but again the normal anatomical arrangement of the vessels present in many cases of simple narrowing is against this as a universal cause.

In considering the recorded cases of congenital stricture of the ileo-jejunal segment two points are striking: First, that the segment may be affected in any part of its length by single or multiple constrictions, which, when considered as gross anatomical lesions, resemble one another closely, and in their difference in degree tend to form definite steps in a series. Secondly, that these apparently similar conditions have been credited with widely divergent origins.

The causes given above in the mechanical group do not apparently occur sufficiently often to disprove the possibility of their being associated lesions—secondary developments in portions of gut already malformed. It is difficult, therefore, to avoid the conclusion that there is some common primary etiological cause underlying all these lesions.

The two factors that would appear to account for the majority of these cases are: deficient evolution of the intestinal tract and excessive involution of the vitelline duct, but the details of the processes underlying these departures from the normal are at present little understood.

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OPTIC ATROPHY.*

BY

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"OPTIC ATROPHY" is a term applied to a pale condition of the disc when some or all of the fibres of the visual path as they pass through the foramen sclera are degenerated. Pallor does not always mean atrophy, but when associated with a permanent defect in the visual field it probably represents atrophy. The cause of pallor is not always very obvious; in some instances it is determined by emptiness of capillaries at the disc; in the grey pallor of tabes it is difficult to say what the coloration is due to; in post-papillitic pallor the fibrous tissue elements decide the whiteness.

In a degeneration of the nerve such as is met with in tabes or disseminated sclerosis there is a wasting of the nerve elements due to constriction by the proliferation of the supporting structures with the minimum of inflammatory change. In this type of case the neurone is affected in the course of its axis-cylinder process. Should the neurone be affected at the cell level—that is, in the retina—the axis cylinder undergoes degeneration, which may produce a very similar picture as, for instance, in alcohol-tobacco combined poisoning.

A direct compression of the neurone between the disc and the lower visual centres (for example, pituitary enlargement) gives rise to a simple degeneration which takes place fairly rapidly towards the retina as well as towards the brain. A different picture results from a stasis at the nerve head, produced by pressure of cerebro-spinal fluid, such as occurs in brain tumour. Here there is much swelling of the supporting tissues; the pressure affects the neurone, but not for some time, and, although inflammatory products are not in evidence, the subsidence is attended by proliferative changes of the glial and endothelial elements; formation of fibrous tissue and compression of the nerve elements ensue. In neuritis the fluid in the subarachnoid space round the nerve may not be under increased pressure, but there may be an inflammatory condition of the meninges clothing the nerve and of the pial septa with vasculitis and cellular changes. Here the subsequent proliferation is marked and perivascular proliferation leads subsequently to marked contraction of the vessels. Even in a simple occlusion of the central artery, where the neurone suffers from sudden deprivation of nutrition and death at the level of the retina, there is a perivascular proliferative change at the disc productive of fibrous tissue. The amount and distribution of the fibrous tissue give a clue to the cause of the atrophy, and the appearance of an atrophic disc is determined by the relative changes which take place in nerve element, interstitial tissue, and vessels respectively. It may be an advantage to think of the general causation under three heads:

1. Initial damage to the neurone itself (parenchymatous).
2. Initial damage to the supporting tissues, with or without oedema or inflammatory exudate, followed by secondary damage to the neurone (interstitial).
3. Initial interference with the blood supply with secondary damage to the neurone (vascular).

Of all the causes of atrophy, congested disc is chief. It is of two main distinct types (different in method of production but very similar in ophthalmoscopic appearance), frequently referred to as papillitis and papilloedema. Both are associated with redness and swelling; but the one is active, the other passive. If a localized inflammation takes place sufficiently far back along the nerve the disc may not show any change, but this is not very common. With these points in mind, I show a rough tabular grouping of different types of optic atrophy, giving in brackets some of the common terms used in the books to designate different types. There is, of course, much overlapping in such a grouping and it cannot be regarded as accurate, but from a clinical point of view it may be thought useful.

Types of Optic Atrophy.

1. Optic atrophy following direct damage to neurone by pressure or selective poisons, including subinflammatory increase in interstitial elements, excluding inflammation and oedema.
   - *At the level of the retina:* Methyl alcohol, alcohol, and tobacco; diabetes. (Axial atrophy; partial atrophy.)
   - *At the level of the papilla and pars arteria centralis:* Glaucoma; tabes, insular sclerosis. (Simple atrophy; spinal atrophy; primary atrophy; genuine atrophy; tabetic atrophy; grey atrophy; non-inflammatory atrophy.)
   - *At the level of the orbito-cranial portion of nerve and tract:* Pituitary diseases; insular sclerosis; tabes; fracture; hydrocephalus; carotid pressure. (Simple atrophy; secondary atrophy; descending atrophy.)
2. Optic atrophy following damage to neurone through post-inflammatory or post-oedematous change in supporting tissues.
   - *At the level of the retina:* Retinitis pigmentosa; retinitis (syphilitic) and choroiditis (renal). (Consecutive atrophy; ascending atrophy.)
   - *At the level of the papilla and pars arteria centralis:* Syphilis; renal disease; brain tumour; oxycephaly, etc. (Post-neuritic atrophy; post-papillitic atrophy; secondary atrophy.)
   - *At the level of the orbito-cranial portion of nerve and tract:* Acute true retrobulbar neuritis; periostitis; orbital cellulitis and abscess; nasal sinusitis; influenza; encephalitis; acute infective diseases. (Secondary atrophy.)
3. Optic atrophy following damage to neurone and supporting tissues by deprivation of blood supply.
   - *At the level of the retina:* Arterio-sclerosis (with and without high blood pressure); embolism of central artery; quinine. (Retinitic atrophy.)
   - *At the level of the papilla and pars arteria centralis:* Retrobulbar growth (?); haemorrhage into sheath; disease of central vessels (?).
   - *At the level of the orbito-cranial portion of nerve and tract:* Vascular disease.

The commonest variety of optic atrophy which we meet with in India is the post-neuritic atrophy of syphilis. Although a post-neuritic atrophy apart from the papilloedema and papillitis of cerebral tumour or meningitic disease may not be thought very common, in Madras there is no doubt that our most frequent atrophy is one which follows a mild insidious bilateral neuritis, which in no way resembles a papilloedema, inasmuch as all that can be seen during the neuritic stage is an almost flat dull-red disc with perivascular disc changes. Colonel Kirkpatrick laid stress on this variety during the period of his superintendency. In 284 cases of optic nerve diseases collected between 1914 and 1918, of which he took careful notes, syphilitic neuritis preceded this atrophy in by far the greatest number of cases. Of 58 cases of optic atrophy admitted to the wards in 1919 he states the bulk was syphilitic. The mildness of the neuritis and its insidious progress to a post-neuritic atrophy with a white

* Abstract of an address delivered to the Madras Branch of the British Medical Association on February 5th, 1923.

disc, narrowed vessels, and an ill defined edge, induce one to think that the process is a localized perivasculitis of the nerve in the region of the papilla. The large vessels at first are normal; then the nasal arteries show white sheathing and narrowing, as also do the veins, until blindness eventually sets in with complete atrophy. There is no evidence of serous meningitis or cerebral symptoms. The fields usually show a generalized contraction for form and colours. It is very important to recognize these cases in the beginning, as they respond fairly well to mercury in the early stages. It is our custom to avoid arsenical preparations. I have on several occasions seen much harm done by the injudicious administration of large quantities of novarsenobillon and similar products.

In the atrophy of glaucoma one may get a pallor of the disc which I have often seen mistaken for simple atrophy. There are some cases in which a diagnosis is not at first clear. It may be a partial simple atrophy with the slightest cupping of the disc associated with giddiness, pain in the head, and other symptoms pointing to cerebral trouble. A careful perimetric investigation ought to disclose the true nature of such a case. The enlargement of the blind spot, as determined with the Elliot scotometer, and the nature of the contraction of the field will dispose of such conditions as are likely to give rise to bilateral simple atrophy. In addition, the peculiar features of glaucoma, such as intermittent increase of tension, help in making a diagnosis.

We must distinguish between ordinary renal disease and albuminuria arising during pregnancy. Ordinary renal disease, and in particular chronic interstitial nephritis, gives some of the most striking examples of papilloedema. As a rule the papilloedema is associated with retinitis, but there are certain cases in which this is not so, and here it becomes a matter of considerable difficulty to diagnose the condition from the papilloedema of brain tumour because certain of the pressure symptoms are very similar. We do not very often see optic atrophy which is the result of such nephritic cases because these patients commonly die not long after the establishment of the condition. This is not so, however, with the type of cases met with in connexion with pregnancy. Here one sees numerous cases of papillitis which apparently settle down altogether after the termination of the pregnancy. There seems to be much confusion about the signs and symptoms associated with the toxaemias of pregnancy, and the eye condition does not help in elucidating the mystery. All one can say is that from time to time, not very commonly, one sees post-papillitic atrophy, either partial or complete, with a history of onset associated with pregnancy, parturition, or the puerperium.

To the chemist and pharmacologist perhaps the most interesting group of atrophies is that associated with toxic neuritis (commonly called retrobulbar), in which the damage is directly to the neurone itself. A large group of substances is known to give rise to the disease called "toxic amblyopia," which is frequently associated with temporal pallor of the disc and true atrophy. It is unnecessary to quote the list at length: methyl alcohol, tobacco, ethyl alcohol, quinine, lead, carbon bisulphide, arylarsenates are all included.

Last year we had a case in which a man had a "swig" of methylated spirit and was blind the next morning. By the time we saw him, some weeks later, there was complete optic atrophy. It would have been very difficult to tell from the appearance of the disc what the type of atrophy was; it might readily have been mistaken for the white disc and thread-like vessels of an old case of post-neuritic atrophy.

Quinine, although used in such enormous quantities in India, is in our experience rarely productive of atrophy. The effects of quinine on the eye seem to depend more on idiosyncrasy than dosage (provided the dosage is within medicinal limits). Some time ago, when the arylarsenates were more used, definite damage was done to the optic nerves. Fortunately tobacco does not as a rule produce atrophy; the vision usually returns to normal when the poison is cut off.

I turn now to some atrophies, both simple and post-papillitic, of surgical interest. The characteristic atrophy of pituitary enlargement or tumour in the neighbourhood of the pituitary body is of a simple, so-called secondary descending type. It is as a rule partial, and irregularly developed on either side; the characteristic feature in many cases is the peculiar field; there are no signs of brain tumour—that is to say, the ordinary pressure symptoms and papilloedema are absent. The appearance of the disc together with the peculiar field and *x*-ray investigation generally establish the diagnosis.

Most brain tumours produce an atrophy subsequent to papilloedema. It is sometimes very difficult to differentiate between the papilloedema of brain tumour, renal disease, and serous meningitis, such as might, for instance, occur in syphilis. Another rare but interesting type of case from a surgical point of view which is frequently associated with an optic atrophy of a post-papilloedematous type is oxycephaly.

From the point of view of public health I will briefly refer to a type of atrophy that we sometimes observe but know very little about. It appears in certain schools and similar institutions; the sequence of events is as follows:

The young patient is sent to the hospital for glasses because the vision is poor. We find that there is a definite drop in the visual acuity which is not accounted for by the condition of the discs. We also observe mild neuritis. As a rule the condition improves with food, tonics, and cod-liver oil. Associated with the condition very frequently is angular stomatitis. Certain cases of this group go on to a partial optic atrophy with general contraction of the fields. We have not been able to detect central scotoma, although at first sight one would expect to find central scotoma if the cases fall into the group of toxic amblyopias. It may be that the condition is purely one of nutritional disturbance.

Unsuitable and insufficient food with secondary alimentary disturbance is, I cannot help thinking, the big factor in many of our common pathogenic states—vascular degeneration, early senility, cataract, diabetes, etc.

A very interesting group of cases which form a potential source of optic atrophy is that associated with diseases of the nasal accessory sinuses and teeth. To save time I omit disease of tonsillar and otitic origin from the group. Neuritis, supposed to originate in infected sinuses or apical dental abscesses, has attracted much attention in the last few years. These cases are not only of peculiar interest to the throat, nose, and ear specialist and the dental surgeon, but also to the bacteriologist, who has taken a considerable part in their elucidation. It is stated in authoritative works that over 50 per cent. of nasal sinus trouble shows optic neuritis, and again that half the cases of unilateral optic neuritis are of nasal origin. Large numbers of papers on this topic have been published during the last three years, and Onodi's dissections show how nasal sinus disease may affect the nerve because of its contiguity. For the most part the cases we see are direct extension of inflammation to the cellular tissues of the orbit or through the large venous anastomoses which connect up the sinuses with the orbit. These are of course usually unilateral. Abscess of the orbit is quite common here, especially in children. It is very frequently mixed up with other conditions, and on this account many children lose their eyes from subsequent atrophy because the pus is not evacuated in time. The majority of cases of unilateral acute proptosis in children is due to abscess (this is not so in adults).

Local extension by venous or lymph channels may also take place from dental foci via the pterygoid plexus and the periosteum; but, apart from those cases in which there is an obvious local extension, a definite bilateral papillitis may sometimes be observed at the disc in which one must consider not only a local process originating in both nerves posteriorly (for example, posterior sinus disease), but also the possibility of a blood stream infection—the so-called focal infection.

A recent case showed a bilateral neuritis associated with considerable contraction of the fields and sectoral changes in the colour fields in which the only obvious cause was apical abscess. On removing the several teeth involved there was an immediate drop in the vision, which not only pointed towards the true cause, but taught one to be careful about stirring up extensive foci of infection. It would probably have been better to remove one tooth at a time.

As regards the reality of the connexion between apical abscess and eye disease, Benedict's work illustrates the way in which investigations in this field are dependent on the co-operation of bacteriologist, radiologist, dentist, nose specialist, and ophthalmologist.

Last year we had several very satisfactory cases in which drainage of infected sphenoidal cells was attended with clearing up of a neuritis. Here I must sound a note of warning to those who are unfamiliar with exploratory procedures of the nasal sinuses. Cushing, in a paper published in 1920, emphasizes the danger of these operations in the hands of the unskilled. My experience of a number of cases has been that, if there is obvious disease of the accessory sinuses associated with bad drainage, the smallest operation compatible with good drainage should be performed. The very gross cases of purulent sinusitis which are not uncommonly met with in Madras are to my mind more frequently

associated with globe trouble, such as unilateral scleritis and uveitis or cellulitis. If there is no obvious disease the smallest exploratory procedure compatible with an accurate diagnosis is indicated. I have seen no bad results from a careful extension of the sphenoidal ostium downwards, and at least it precludes retention in this all-important space. Indiscriminate cutting operations in the nose are without doubt almost as criminal as is a wholesale extraction of teeth on account of a suspected focal infection.

There are so many points in connexion with optic atrophy which interest the physician that it is difficult to pick out types for discussion. As regards general paralysis, it has been suggested to me by an eminent mental specialist that general paralysis is often missed in India. In this city I rarely see it. In the following two cases there was practically complete loss of vision in association with extensive central nervous system syphilis of a congenital type.

In one the partial atrophy is of a decidedly post-neuritic type, in the other it is of a primary or simple type. In the first case there was extensive neuritis and extensive paralysis. When we first saw this boy he was blind except for perception of light. Colonel Elwes, first physician, General Hospital, kindly took over the case. The patient is now able to see perfectly well and can get about. He has contraction of the fields, a slight degree of optic atrophy, but gets 6/5 central vision in each eye. He has a certain amount of spastic paralysis of the limbs, he is slightly deaf, has not had interstitial keratitis, but has the characteristic teeth.

In the other case the atrophy is of a simple variety, there has never been papillitis, the gait is of a spastic type, reflexes are increased, and vision is markedly reduced. The teeth are not in any way typical, but the two other members of Hutchinson's triad are present—the deafness and remains of an interstitial keratitis.

Finally, I mention the association of optic atrophy with the meningitides of childhood. We very frequently see double optic atrophy in children, either simple or post-papillitic, and as often as not we get a history of fever or fits preceding the onset of bad vision. The history is unreliable, and as in this hospital we do not come in much contact with the diseases of children, I would be very glad to obtain the views of general practitioners or physicians on the subject of meningitis occurring in children in which recovery takes place but which is followed by optic atrophy.

DIPTHERIA CARRIERS.

BY

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AN outbreak of diphtheria occurred at a school in Simla in March, 1922. Eight cases occurred from March 14th to 23rd: they were all from the same source of infection—a boy who arrived from Karachi in March suffering from diphtheria; the others were direct contacts.

Sporadic cases occurred on the following dates: May 19th, 1; July 3rd, 1; July 7th, 1; September 9th to 19th, 4. There were 15 cases in all with one death (case of May 19th).

The interest in this outbreak lies in the question of carriers and what factors go to make "healthy carriers" as apart from "disease carriers." By the former I mean those who have shown no symptoms of the disease, and yet who have present in their throats diphtheria bacilli; by the "disease carrier" I mean those who have had a definite attack of diphtheria and have entirely recovered except that throat swabs still show the presence of diphtheria bacilli.

In this outbreak the whole school of 200 boys were given, in March, prophylactic injections of diphtheria antitoxin, and, later, as cases occurred, all contacts were given further prophylactic injections.

In the first batch of 200 there were roughly 5 per cent. who, after some days, developed mild anaphylactic symptoms (rashes and painful joints); after the subsequent injections this percentage increased to roughly 10 per cent., with rather more pronounced symptoms, but nothing of the nature of anaphylactic shock, nor, indeed, any such symptoms as to cause a moment's anxiety.

On May 20th examination for "disease carriers," by taking three consecutive daily swabs instead of the usual one from each of the eight cases who had recovered from diphtheria, showed one to be an intermittent carrier. On the occurrence of the cases in July a further examination of these cases, the three swabs being increased to six consecutive daily swabs, showed that six out of the original eight were intermittent carriers: these were duly segregated.

On September 9th, after two months' interval, another sporadic case occurred; all possible disease carriers—on the six day test—had been segregated; there was no other known source of infection. The health officer and I decided that it would be to the interest of the boys, in the presence of this unknown source of infection, to advise the governors to close school; we were of opinion that the school drains had nothing to do with the infection.

I decided to examine the throats of all the schoolboys and also the menial establishment with their families, and to mark down for bacteriological examination all those who had reddened throats or large tonsils. There were 59 such cases; one was an ambulatory case of mild diphtheria, both tonsils being covered by a creamy membrane; he was unaware that he was ill; his throat swab was positive; he had the signs and symptoms of a mild diphtheria. Of the remaining 58 cases 50 per cent. proved to be carriers. A few of the remaining 141 boys were examined as these had to remain behind for an examination, the remainder returning to their homes.

Thus one may say that of the 200 boys 15 contracted diphtheria, and out of the remainder (*plus* 14 of these) 80 were examined and 40 found to be carriers. Some 250 prophylactic injections of diphtheria antitoxin were given.

What are the facts of this condition of things? The drains had been the same for twenty years and no such epidemic had occurred before; the source of infection was the boy from Karachi; prophylaxis had been done on a large scale; an injection of diphtheria antitoxin neutralizes some or all of the toxins of any diphtheria bacilli present and thus prevents more or less the symptoms of diphtheria arising, but does not kill the germs that may be present—diphtheria bacteriolysin would be necessary for that purpose, but is not available in India.

We are driven to the conclusion that prophylaxis is a two-edged sword. We must, on the outbreak of diphtheria, give prophylactic injections to all contacts, but where antitoxin only is used it behoves us to be on the look-out for a crop of diphtheria carriers as a result. A recent bacteriological examination[1] carried out at the Royal Hospital for Sick Children and the school clinics, Liverpool, on a series of tonsils removed at that hospital, showed that in 30 per cent. diphtheroid bacilli were present. It is very probable that there is quite a considerable percentage of the public at large who are diphtheroid carriers.

From a clinical point of view there are three types of cases of "sore throat": (1) Where the clinical manifestations of a diphtheritic throat are present and where the bacteriological report is positive. (2) Where the clinical manifestations of a diphtheritic throat are present but where the bacteriological report is negative. (3) Where there are no clinical manifestations of a diphtheritic throat and the bacteriological report is positive.

Classes (1) and (2) must both be regarded as diphtheria and treated accordingly. It is of interest that of the 15 cases of diphtheria which occurred during this outbreak there were two pronounced negative bacteriologically, and one of these was the only fatal case of the series; there was no error in technique in putting up the throat swab or delay in incubation of a smear from it.

As regards class (3) it is possible and probable that such cases are merely some inflammatory condition of the naso-pharynx, and the bacilli found are non-pathogenic and non-causative of the condition; clinically there were several such cases in this series, which were nevertheless looked on and treated as diphtheritics.

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THE Gifford lectures delivered in the University of Aberdeen in 1921 and 1922 by Dr. E. W. Hobson, F.R.S., Sadleirian Professor of Pure Mathematics in the University of Cambridge, will be published in a volume this summer by the Cambridge University Press. In the lectures an attempt was made to settle the relation of "that complex of knowledge and ideas which is denoted by the term Natural Science" to religion and philosophy at the present day. The author has examined the historical development, aims, and true characteristics of the various departments of natural science, and arrives at the conclusion that many men of science have exaggerated our dependence on natural science in our general outlook on the world and in present-day thought.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ACUTE AMOEBIC DYSENTERY IN A MAN WHO HAD NEVER BEEN OUT OF ENGLAND.

ALTHOUGH cysts of *Entamoeba histolytica* have been found in a small percentage of cases in persons who have never been out of England, yet acute amoebic dysentery is very rarely seen. Dobell says: "I do not believe that more than 10 per cent. of persons who become infected with *Entamoeba histolytica* ever suffer to any appreciable extent from their infection; and I think it very probable that even this is much too high an estimate." A few cases of acute amoebic dysentery occurring in persons who have never left England have, however, been recorded. Marshall in 1912 and Worster-Drought in 1916 each described a case.

A. C., transport driver R.A.F., aged 19, lived in a village in Dorset. He joined the R.A.F. eighteen months ago, and was stationed at Uxbridge, then at Manstone (Margate), and finally at Lee-on-Solent.

Neither he nor any of his family has had dysentery. He was well till February, 1922, when diarrhoea commenced. He did not report sick. Two days after returning to his home on holiday (August 6th) he first noticed blood and mucus in the stools, and these became more frequent and were attended with considerable pain. He was admitted into the Royal Victoria Hospital here on November 7th, 1922. As he did not respond to any treatment, Dr. Turton, the house-surgeon, sent me a freshly passed stool for examination on January 12th, 1923. This was of the consistency of pea-soup, of a deep brown colour, and almost homogeneous. In it I found numerous active amoebae, many of which contained several red blood corpuscles.

Films were made subsequently from small blood-stained masses, and were fixed whilst wet with corrosive sublimate and alcohol, with and without the addition of acetic acid. They were stained with iron haematoxylin, Mann's methyl blue, and eosin, and with Giemsa's stain. Many of the amoebae contained red blood cells, and the nucleus had a delicate achromatic membrane lined with chromatin granules, and had a small spherical karyosome in the centre.

Having made quite certain of the nature of the disease, Martindale's capsules of emetine bismuth iodide (gr. iii), one a day, were given for twelve days. All the patient's symptoms, which had been in existence for eleven months, ceased, the stools became solid, and he gradually regained his strength.

Numerous examinations were subsequently made, but no cysts of amoebae were found.

I can only conjecture that his infection was from *Entamoeba histolytica* cysts of some carrier in the R.A.F.

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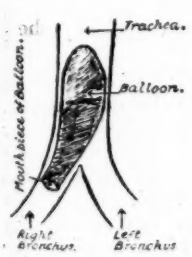
AIR-BALL IN TRACHEA.

THE following account of a case of death from asphyxia may be of interest.

A. S., aged 6 years, was brought to the Metropolitan Hospital dead on the evening of March 5th, 1923. There was a history of the child having swallowed a toy balloon some few minutes previously. The lips, face, and finger-tips were intensely cyanosed.



The necropsy revealed that the balloon was lying in the trachea, at its bifurcation, and that the mouth-piece of the balloon was projecting into the right bronchus. The position of the balloon was such that any attempt by the victim to expel the balloon would have resulted in air from the right bronchus passing into the balloon and inflating it.

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COLLOID ARGENTUM IN RUPTURED PERINEUM.

IT often happens in midwifery practice that, in spite of every care and attention at birth, the torn perineum refuses to heal after being sutured. For this reason I desire to bring to notice my experience with colloid argentum.

Recently I had a bad forceps case with a rigid perineum; early rupture of the membranes took place; the perineum was torn from the fourchette to the sphincter ani (but not involving it); there was also a lateral tear into the left labium, which bridged across the head in its descent and required cutting before the head was born.

Several sutures (silkworm gut) were used, but all had to be taken out on the third day as they had become sodden. I told the nurse on the following day to paint the raw surfaces with equal parts of "Oscol" argentum and distilled water night and morning, and I then put in three catgut sutures. A fortnight after the date of labour the surfaces had come together and the patient was able to get about.

It is more than five years since I first used a similar preparation in a case accompanied by gonorrhoeal vaginitis and obtained satisfactory results. Since then I have used it in cases where stitches have failed owing to septic changes, or had become absorbed before the perineum was healed; in some cases I inserted fresh catgut sutures as late as the fifth or seventh day after labour. In every case I have had complete satisfaction. Instead of having a glazed surface when the torn perineum has failed to unite after primary suture, by simply applying the colloid argentum it has produced raw bleeding surfaces, which have knit together very quickly.

It may be argued that the torn surfaces would probably have healed without any applications, simply because they were kept clean; but I do not think that catgut sutures inserted, for the second time, a week after (as has happened in a case of mine) would have done their work so well.

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BRONCHOPNEUMONIA IN A CENTENARIAN.

A CENTENARIAN is rather a *rara avis*, so that the following notes on a lady of 103, who recovered from a moderately severe attack of bronchopneumonia, may be of interest.

Mrs. C. had been bed-ridden for some years as a result of an injury eight years ago, but had retained her memory and mental alertness; she had enjoyed good health until March 1st, 1923, when she contracted a chill.

I was called to see her on March 7th; she was flushed and restless, and suffering from a harsh, dry cough with short, rapid respirations. The temperature was 103°, the pulse 140, and the respirations 44. There were sordes on the tongue and lips. Examination (which was superficial, owing to her condition) revealed harsh rhonchi all over both lungs, with an area of diminished resonance, crepitations, and some bronchial breathing in the left base in the axillary line.

For six days her condition was critical, then defervescence gradually set in, and by the end of a fortnight convalescence was fairly established.

On April 5th, however, senile gangrene began in the right foot and four days later the patient died.

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SYPHILIS INSONTIUM IN SCHOOL CHILDREN.

THE following three cases of accidental acquired syphilis, which were recently seen at Cardiff School Clinic, are recorded as pointing to the prevalence of this condition in children and the possibility of the disease being overlooked:

A boy, aged 13, was brought by his sister who said he had ringworm. On further questioning she stated that he had sores between his legs and that there had been a sore there some three months previously for which ointment had been used. On examination he was found to have very marked syphilitic alopecia, anal condylomata, and general adenitis. The Wassermann reaction was positive and well marked.

A boy, aged 13, was reported as suffering from impetigo and ringworm and had been treated as such for some weeks. There was a somewhat indefinite history of a sore on the tongue four months previously. At the time of examination alopecia was very marked, and there was a serpiginous scaly rash on the scalp, trunk, and limbs, impetigo in places, especially on the scalp, and general adenitis. The Wassermann reaction was positive and well marked.

A boy, aged 12, according to his mother, had had chicken-pox (? pustular syphilide) a week or ten days earlier, and was now suffering from ringworm and sores on his body. On examination he showed a copper-coloured squamous syphilide resembling psoriasis, impetiginous areas on scalp, alopecia, general adenitis, and ulceration of the mouth and left tonsil. The Wassermann reaction was positive and well marked. The mother remembered the boy having a sore in his mouth and swollen glands in the neck some months ago.

All the cases cleared up rapidly after a course of novarsenobenzol injections and grey powder at the venereal disease clinic.

The source of infection was not definitely traced in any of these cases, although the home condition of one of the boys was very unsatisfactory. The superficial resemblance which the cases bore to ringworm, impetigo, and psoriasis diverted attention from the possibility of secondary syphilis, and it was only after a more complete examination that the true nature of the disease was established.

H. SHEASBY,
Assistant, Cardiff V.D. Clinics.

Reports of Societies.

MANGANESE IN CHEMOTHERAPY.

AT a meeting of the Dermatological Section of the Royal Society of Medicine, with the President, Dr. H. G. ADAMSON, in the chair, Mr. J. E. R. MCDONAGH read a paper on manganese as a chemotherapeutic agent. He said that clinical experience with arseno-benzene led him to believe that the drug did not attack the *Leucocytozoon syphilidis* directly, but indirectly through the protein particles in the plasma. Seeking an explanation of the action of chemotherapeutic drugs he came to the conclusion that metals acted as catalysts in the oxidase reaction and non-metals as catalysts in the reductase reaction; further, that metallic preparations increased the number of protein particles and augmented their negative charge, while non-metallic preparations caused the protein particles to agglutinate and diminished their electric charge; in short, that metals acted as conductors of electricity and non-metals as condensers. Micro-organisms behaved in varying degree as condensers; thus among coccogenic bacteria the staphylococci were the most feeble, and of protozoa the *Leucocytozoon syphilidis* was the most potent. Conduction increased the number of the protein particles, diminished their size, hastened their movement, and augmented their negative charge. This meant that the expanse of surface exposed to the parasites was increased enormously and the additional negative charge enabled the protective substance to turn the tables on the parasites. If the parasites lost sufficient negative electricity they underwent lysis and were destroyed. All the immunity tests were based on the electrical relationship between the protective substance and the micro-organisms. As the conductor action of metals varied much, and as the nature of a metallic compound influenced its conductor effect, tests were devised to determine the degree of dispersion that could be produced, and several compounds were tried, first in simple and then in complex infections. Some idea of the conductor action of a metallic preparation could be judged by its ability to accelerate coagulation. Conductors parted with their electrons, and these, when taken up by Gram-positive micro-organisms, changed them to Gram-negative; the better the conductor the more rapid the change. Conductors raised the suspension stability of the blood and increased the percentage of blood-sugar in the plasma. Condensers diminished the number of particles and caused them to increase in size and agglutinate; retarded coagulation; made Gram-negative micro-organisms Gram-positive; and caused a fall in the percentage of blood sugar. The most suitable conductor was manganese, which in its colloidal hydroxide form was useful in the simplest infections. With the hope of finding a preparation equally beneficial in streptococcic and gonococcic infections he experimented, and found manganese butyrate the most efficient. In simple infections the degree of conduction required was not great, but there must be no condenser action. A 1 per cent. solution of manganese butyrate fulfilled these requirements. Of this preparation never more than three injections should be prescribed in any one course. In his experience two injections sufficed, and these should be injected intramuscularly in 1 and 1.5 c.cm. doses respectively, with three or four clear days' interval between them. Manganese butyrate was valuable in boils, carbuncles, erysipelas, whitlows, lymphangitis, and lymphadenitis, and useful in acute gonococcal urethritis, abscess formation, epididymitis, and in gonococcal septicaemia if given early. In septic conditions, including tonsillitis, quinsy, and even rhinitis, manganese butyrate should be given a chance before an incision is made. If prescribed in time the lesion would abort, while if pus had already formed a single injection would bring it to a head. The pus should be evacuated through a small incision, and dry dressings and not hot fomentations applied. In operations on septic bones and joints manganese butyrate expedited healing.

Dr. H. G. ADAMSON (President) confessed to great difficulty in following Mr. McDonagh's arguments clearly. Many of his theories were not supported by sufficient evidence, but he (the President) was not really competent to offer any material comment, and he would be glad to hear remarks from others, particularly from those more conversant with biochemistry. On the practical side he congratulated Mr. McDonagh on having obtained in the long list of cases of different types of coccic infection the good results with manganese butyrate which his theories had led him to expect. He hoped these good results would be confirmed by the experience of others, and that manganese butyrate would prove to have the value in the treatment of lupus vulgaris which was predicted for it.

Dr. A. M. H. GRAY said he did not pretend to understand the elaborate experiments Mr. McDonagh had made in this research. His own experience of manganese had not been so favourable as that of Mr. McDonagh. He (Dr. Gray) found that in a case of boils which responded well to manganese almost miraculous results could be obtained from one or two injections, and, on Mr. McDonagh's advice, he had never given more than three injections, at two or three days' interval. But he had often found that some weeks afterwards there was a relapse, and then, at that stage, the giving of more collosol manganese produced no benefit. That occurrence did not seem to fit in with the explanation Mr. McDonagh had given. He was interested to hear from Mr. McDonagh that colloidal manganese contained no peptone, because he had assumed that one was not dealing with the effect of manganese at all, but with protein shock, which had a great effect on lesions of that type, but generally failed to bring the result off a second time.

Dr. HALDIN DAVIS said that Mr. McDonagh had once more given the profession a remedy of considerable value, as he had done when he introduced collosol manganese, which he (Dr. Haldin Davis) had used a good deal and with gratifying results. Having listened to Mr. McDonagh he was quite prepared to admit that manganese butyrate was probably a very useful remedy; but he failed to follow the arguments by which he supported his theory of the action of this drug; Mr. McDonagh employed a terminology entirely his own. He used the terms "condensation" and "dispersion" to denote some electrical change in the blood and tissue fluids, but he had not indicated how he measured the electrical changes thus adumbrated. He had said that a change of an electrical nature had in one direction caused a quicker coagulation of citrated plasma, while a change in another direction caused a diminution of the blood sugar. He (the speaker) was unable to follow the correlation between those changes and the postulated electrical phenomena. His opinion was that Mr. McDonagh very likely had found a useful remedy, but the discovery had really been made by the old method of trial and observation, and that its action was by no means due to electrical changes, which had never been actually demonstrated to be caused by its administration.

Mr. H. FINKLESTONE-SAYLISS summarized the results of treatment by manganese butyrate at the London Lock Hospital.

Mr. MCDONAGH, in his reply, said that it had never been suggested to use manganese butyrate in lupus vulgaris. The clinical results with the butyrate were much superior to those with the hydroxide, especially in gonorrhoea. As for the criticisms of his paper, these could not be answered without reiterating what he had just read. No words had been coined, and the subject was extraordinarily simple, as he believed most would find when reading the article at leisure. He believed he was the first to find out that arseno-benzene did not attack the syphilitic micro-organisms directly, but indirectly through the protein particles in the serum.

PELVIC ADENOMYOMATA.

A MEETING of the Obstetrical and Gynaecological Section of the Royal Society of Medicine was held on May 3rd, with the President, Dr. T. WATTS EDEN, in the chair. Dr. ARCHIBALD DONALD read a paper on the clinical aspects of adenomyomata in the female pelvic organs. He suggested that it was necessary first to get clear on the question of terminology. An adenomyoma was a tumour composed of glandular and muscular elements. The glands were lined by columnar cells, and were surrounded by, or rested on,

unstriped muscle cells and a stroma of small cells. The name "endometrioma" had been suggested. It were better not to use the term, since it implied the acceptance of a theory as to the mode of origin of the growths. Nevertheless there was no doubt that in some cases the elements in adenomyomata behaved like those in the endometrium. Sometimes the "cystogenous tissue" took on a decidual reaction during pregnancy, and in many cases the spaces were filled with altered blood—the result of haemorrhage during the menstrual periods. Other writers, again, believed that adenomyomata of the recto-vaginal space were the result of inflammation, and the strange term of "adenomyositis" had been invented.

Adenomyomatous growths were not confined to the female pelvic organs. They had been found in the intestinal canal and in the umbilicus. In the pelvis they were found in the uterus, the round ligaments, Fallopian tube, ligament of the ovary, the ovary, and recto-vaginal space. They might be present in only one of these positions, in more than one, or even in all six simultaneously. Probably the order of frequency was: ovary, pouch of Douglas, and less commonly the other structures, including the uterus.

He wished to make some remarks on the infiltrating ovarian cyst with tarry contents. Frequently these cysts were associated with adenomyomatous growths in the recto-vaginal space. They were situated on the back of the broad ligament, were often bilateral, never attained great size, possessed powers of infiltration or dissection, but were not truly malignant. They contained somewhat thick viscid contents of a tarry or chocolate-brown colour. These were now recognized—and the microscope confirmed the finding—as adenomyomata of the ovary, and it seemed probable that in some cases adenomyomata of the pouch of Douglas were derived from them, just as warty growths of the peritoneum were caused by a rupture of a papilliferous ovarian cyst.

Turning to the clinical side, the lecturer described 16 cases which had occurred in his practice in 1922. The youngest patient was 23 and the oldest 47. None had reached the menopause. Two were single. Of the 14 married patients 5, or nearly one-third, had never been pregnant. Of the 9 remaining, 5 had had one or more miscarriages. These figures seemed to indicate a relation between adenomyoma and sterility and abortions. The symptoms of adenomyomata were dysmenorrhoea, pain or pressure in the rectum, and dyspareunia. Dysmenorrhoea was the most common. It was usually most acute during the first day or two of the period. Profuse haemorrhage at the periods was complained of in 7, or nearly half the cases, but there was reason to believe that it was not a symptom of adenomyoma (unless the growth was in the uterus), but was due to some other coexisting condition of the uterus. The physical signs were: (1) Hard or irregular swelling or nodules felt through the posterior fornix. The nodules were generally not much bigger than a pea and might be smaller. (2) Indefinite resistance at one or both sides of the uterus, and sometimes definite enlargement of the ovary. (3) Retroposition of the uterus and limitation of mobility. Sometimes only one of these signs was discovered. Very acute dysmenorrhoea beginning before the onset of the period or during the first day, and often coming on some years after establishment of the periods, was very suggestive. Pressure on the rectum and acute dyspareunia were also important.

The operations performed varied in severity.

In 12 cases panhysterectomy or subtotal hysterectomy, with dissection of adenomyomatous growth from the pouch of Douglas or rectal wall.
In 1 case removal of one ovary and dissection of nodules from uterus and rectum.
In 1 case removal of fibroid by myomectomy, separation of rectum, and dissection of small adenomyoma from the rectal wall.
In 1 case removal of tarry ovarian cyst.
In 1 case dissection of recto-vaginal growth only.

He believed that adenomyomata were much commoner than was generally thought. Cases were often taken for pelvic inflammation or infected ovarian cysts. The ordinary blood cyst of the ovary was not adherent and was filled with normally coloured clotted blood or with fluid not having the viscid consistence of the contents of the tarry cyst. At operation the existence of adherent cystic ovaries with viscid tarry coloured contents was present in 75 per cent. of cases. Adhesion of the rectum to the lower part of the uterus and the obliteration of the pouch of Douglas was practically always present in recto-vaginal adenomyoma, and after the adhesions were separated, if there was not found a distinct mass, the hard, round, little bodies could be felt.

The diagnosis before operation was not very difficult. The indefinite swelling on each side of the uterus indicating tarry ovarian cysts, the retroposition and limited mobility of the uterus due to adhesions of the rectum, or the hard irregular mass or round nodules, like gunshot, were all suggestive if not conclusive. Severe dysmenorrhoea was also very suggestive.

With regard to the type of operation necessary, he believed that when both ovaries contained tarry cysts and there was a mass or some nodules in the recto-vaginal space a panhysterectomy was indicated. So was it when only one ovary was diseased, but there was a large mass uniting rectum and uterus. If one ovary only was affected and there were merely small nodules in the pouch of Douglas, removal of the affected ovary and dissection of the nodules after separation of the rectum might suffice; but afterwards a careful watch was necessary. The conservative method applied still more to those cases where only one or two nodules were found in the recto-vaginal space.

Dr. H. R. SPENCER did not think the large cysts such as had been described were always adenomyomata of the ovary. Sometimes they were corpus luteum blood cysts.

Dr. HERBERT WILLIAMSON questioned the wisdom of leaving small pieces of the growth adherent to the rectal wall when complete removal would necessitate opening the rectum. He thought the growth would recur if in part left. He strongly advocated the use of x rays and radium in these cases.

The PRESIDENT thought that the reason there seemed to be no trouble with this condition at the menopause was that at that time the growth retrogressed.

Mr. L. P. PUGH afterwards read a paper on ovarian disease in cows.

CEREBRAL TUMOUR.

AT a meeting of the Section of Pathology of the Royal Academy of Medicine in Ireland, held in the Royal College of Surgeons on April 20th, with the President, Dr. W. D. O'KELLY, in the chair, Professor BOXWELL described a case of brain sarcoma.

The patient, a boy aged 4½ years, was admitted to hospital, suffering from convulsions. After a hot bath he recovered. Later on, he was brought back, suffering from another attack of convulsions; this time a hot bath did not cure him, and he had to be given chloroform. Before the attack of convulsions, the child had been very lively, very talkative, and rather precocious for his age. While in hospital, he vomited any solid food, and had severe headaches. When spoken to, he would answer intelligently, but his cerebration became slow and he would not answer for a considerable time after he had been spoken to. His pulse remained at 90, blood pressure 80, and temperature normal. The cerebro-spinal fluid was examined. It was under considerable pressure, but contained no cells. Later, he could only just tell light from darkness, and before he died he was absolutely blind. He died after eight weeks in hospital. The brain showed an extensive cellular infiltration extending under the pia. This consisted of round cells apparently sarcomatous, and he believed that he could trace their origin from the choroid plexus of the fourth ventricle.

Professor Boxwell added that he had called this case one of brain sarcoma, though he thought it might be a case of endothelioma.

The PRESIDENT remarked that the fact that the illness lasted only eight weeks was specially interesting. Dr. T. T. O'FARRELL could not see any connexion between the small tumour in the roof of the fourth ventricle and the main tumour. He had carefully examined the sections which Professor Boxwell had brought down, but he could not see any connexion between the two tissues. He would like to know if the question of chloroma had been considered, and what was the colour of the tumour before it went into formalin. Dr. J. T. WIGHAM said that it looked to him as if the cells in this tumour were very like those covering the choroid plexus, and that it was quite possible that Dr. Boxwell's suggestion of origin was correct. If that was so the tumour

might easily be endothelial in origin, although the cells were like those of a round cell sarcoma. Professor BOXWELL, in reply, said that the tumour was perfectly white in colour.

Two Unusual Cases.

Sir JOHN MOORE read notes on (*a*) a case of pneumonia with untoward sequelae; (*b*) carcinoma ventriculi, with unusual secondary developments.

The first patient, a girl aged 18, was admitted to hospital on January 1st, 1923. She had been ill for five weeks, suffering from what was stated to be pneumonia, which had started suddenly. This illness had apparently told severely on her, as on admission she was very thin and pale. She had a persistent cough, and sputum was brought up in abundance. On examination, Sir John Moore decided that it was a case of acute pneumonia which had failed to resolve, and that the outlook pointed to either pulmonary abscess, or supervening tuberculosis. The sputum was examined three times for tubercle bacilli, but each time the report was negative. A Widal test was carried out, and also proved negative. An exploratory puncture in the dull area over the base of the left lung was made twice, but without tapping any collection of fluid. The liver was greatly enlarged. Towards the end of January, the patient's condition became critical. She steadily lost strength and flesh. The lower limbs became anasarcous, and severe pain set in in the right thigh, apparently due to thrombosis, which finally extended up to the inferior vena cava. The breath and sputum were fetid. On February 20th a pleural friction rub was detected over the base of the right lung. The temperature became subnormal on February 24th, and remained so till the death of the patient, on February 27th. At necropsy the findings reported were: Abscess in (*a*) liver, (*b*) spleen, (*c*) left perinephric region, (*d*) lower lobe left lung. Oesophagus, liver, left lung, left kidney, all adherent to diaphragm. Pus from the liver abscess contained long chains of streptococci. Tubercles were found in the liver, which was extensively infiltrated with fat.

The second patient, a woman aged 56, was admitted to hospital on March 3rd, 1923. She was extremely emaciated, and wore a look of great physical suffering. She had been complaining for nearly a year of gnawing pains over the upper part of the belly, which was very tender on pressure. The pains at first were of a shooting character, but later were of a dull and gnawing character, and kept her awake at night. She was also suffering from loss of appetite, vomiting, constipation, and costiveness. Some months before admission she began to lose flesh rapidly, and during the first nine days in hospital she lost two pounds. Any attempt to take food brought on sickness, and she vomited frothy stuff, and, on two occasions, blood. Her pulse rate was persistently quick, 100 to 120, respirations 24 to 26, and temperature usually subnormal. On examination, a tumour in the lower part of the epigastrium, near the middle line, was found, and enlargement with hardness of the inguinal glands. A diagnosis of carcinoma of the stomach was made, and the case was pronounced to be inoperable. A screen examination of the stomach and duodenum was made, which confirmed the diagnosis. The patient lived until March 25th, when she collapsed suddenly, and died quickly of haemorrhage into the stomach. The *post-mortem* findings were: When the peritoneal cavity was opened, there was an escape of a large quantity of clear, straw-coloured fluid. The falciform ligament was greatly thickened, and was hard and nodular. The gall bladder was adherent to the duodenum. The pyloric end of the stomach was firmly bound down by dense adhesions. The spleen was closely adherent to the greater curvature of the stomach. The peritoneum had a number of nodules scattered over it, and there were several enlarged, hard glands in the mesocolon. The liver was rather small, but showed no secondary nodules. The stomach was small, the wall was hard and thickened. On opening, the stomach was found to be full of blood. In the posterior wall, near the pylorus, was a large, crater-like ulcer, with a fungating growth in the centre of it. The diaphragm was studded throughout with secondary growths, some of which were the size of a shilling.

Dr. BAREND VIVIER demonstrated the specimens. There were two abscesses in the first case, one in the liver, and the other in the base of the left lung penetrating the diaphragm and involving the spleen and left kidney.

Dr. T. T. O'FARRELL inquired as to the origin of the sepsis in the first case, and if a blood culture had been done. He also asked if the oesophagus was quite normal, because sometimes foreign bodies were found in the oesophagus and gave rise to conditions like those described. It would be interesting to know what the source of infection in this case was, and if it was a primary focus.

The PRESIDENT said that, regarding the first case, he was satisfied that there was no tuberculous lesion in the lungs, and he was inclined to think that this was not an ordinary case of tuberculosis, on account of the absence of tubercle bacilli in the sputum, but that the tubercles in the liver were a subsidiary chance infection. The second case was extremely interesting. He thought that haemorrhage in such a case was uncommon. The freedom of the liver from any growth was a point of importance.

Mr. HENRY STOKES said that, regarding the first case, before the needle was put into the patient's chest, she was *x* rayed. There was, at that time, no pleural effusion, and, according to the *x* rays, any abscess must have been small. It had certainly not penetrated the diaphragm.

Sir JOHN MOORE, in reply, said that in the first case no blood culture had been made. He had not looked for any evidence of actinomycosis. He was of opinion that this was really originally a case of pneumonia, and that the infection took its origin in a very seriously damaged left lung. The second case he looked upon as undoubtedly one of ulceration of the stomach, and he thought that this accounted for the illness up to a comparatively short time before death. The fact that cancer of the stomach often supervened on an ulcer was demonstrated in this case.

Dr. T. T. O'FARRELL read notes on cases of (*a*) cylindroma of parotid region; (*b*) adeno-sarcoma of kidney; (*c*) basal cell cancer of neck.

GASTRECTOMY FOR PRECANCEROUS ULCER.

A MEETING of the Surgical Section of the Royal Academy of Medicine in Ireland was held on April 27th. Sir WILLIAM I. DE COURCY WHEELER, who was in the chair, showed a specimen (with *x*-ray photographs) of total gastrectomy for precancerous ulcer of the stomach, and discussed the opinions of Rodman, McAuley, and others on the subject.

The patient was a woman, aged 60, who had a history, extending over fourteen months, pointing to a gross gastric lesion. A gastric ulcer was tentatively diagnosed, but was not definitely confirmed after *x*-ray examination. On opening the abdomen a deeply excavated ulcer, about the size of a shilling, was discovered on the posterior wall, at the cardiac end. The edges were raised and hard, and the glands around the lesser curvature were enlarged. The age of the patient, the induration of the ulcer, and the nature of the glands at once suggested that malignant change had taken place, and, in any event, it was felt that such an ulcer in an elderly woman should be considered precancerous. Total gastrectomy was performed; de Martel's clamps were used to overcome the technical difficulties of the operation. A loop of jejunum was anastomosed to a fringe " tissue held by the clamp immediately at the oesophageal opening. The specimen showed an ulcer which macroscopically appeared to be malignant, but repeated microscopical sections showed no evidence of malignant change. There was some necrosis, with thrombosed vessels and an unusual amount of inflammatory reaction in the submucous coat.

Sir William Wheeler said that, apart from the generally accepted view that gastric ulcers predisposed in a large number of instances to the development of cancer, it was clear that a type of ulcer existed which would become malignant with almost absolute certainty, and should be treated by the most radical operative procedures. MacCarty in his study of precancerous conditions viewed this question from a histological point of view, but it was not possible to say by microscopic sections that cancerous cells not then present would not be present at a future date. The patient made an admirable recovery and now prefers solid to liquid food.

Dr. T. G. HARDMAN, who had made the *x*-ray examination of the patient, showed the films. When an opaque meal was given, a very definite filling effect was shown on the lesser curvature in the recumbent position, but was not present when the patient was in the upright position. Consequently a tentative and not an absolute diagnosis of ulcer was made.

Mr. H. STOKES thought that no other operation than total gastrectomy could have been done.

Mr. W. PEARSON said that the patient made an excellent convalescence. He thought that there had been very little choice of what to do. An alternative to gastrectomy was gastro-enterostomy. He had performed gastro-enterostomy in one such case in which the ulcer felt indurated and the glands were enlarged, and in which it was utterly impossible to attempt excision; the result had been satisfactory; gastro-enterostomy should not always be looked upon as a useless procedure in cases of ulcer in the cardia.

Mr. C. J. MACAULEY considered that unless the surgeon was absolutely convinced that the ulcer was malignant, it was too radical to take out the whole stomach. Though he congratulated the President on the successful way in which he had carried out the operation, yet he felt that this case might have been dealt with by other means.

Reviews.

A TEXTBOOK OF DERMATOLOGY.

DR. ROBERT MACKENNA has produced a textbook of dermatology[1] distinctly above the average. It is quite reasonably comprehensive; we have not noticed any important omissions, while properly enough the commoner diseases are given a greater proportion of space than the rarer conditions. The reader is also materially assisted by the plan here adopted of employing type smaller than that used for the main body of the text for the less important conditions. Another good feature is the provision of tables of the diagnostic points of difference for the more important diseases which are liable to be confused with one another—for example, between syphilis and psoriasis, ringworm and alopecia areata, scarlatina and scarlatiniform erythema, and so on. These tables will be very helpful to the general practitioner in enabling him to make up his mind in doubtful cases. The general practitioner will also be glad to know that the subject of treatment is much more fully dealt with than in many dermatological textbooks and in a much more sensible manner. Full prescriptions are given in most instances and detailed directions for carrying out local treatment. Dr. MacKenna is fully alive to the important part x rays now play in the therapeutics of the skin, but we feel that he might with advantage have provided some general directions as to the type of apparatus best adapted for work in this field and some notes as to the technique. He does, indeed, give some of the points which must be taken into consideration in carrying out the Kienböck-Adamson method of epilating the scalp for ringworm, but he omits to state that the distance between the centres of the irradiated areas must be five inches; if the distance be less there is too much overlapping and consequent danger of an overdose. If the directions given by Dr. MacKenna be followed, in the case of a child with a very small head, the irradiated centres will be too close to one another, while on the other hand, if the child has an abnormally large head, the centres will be too far apart, so that there may be insufficient overlapping of the areas, and hence some portions of the scalp will not receive an adequate dose, and the hair will not fall.

The attitude of the author towards new work is praiseworthy. He is evidently prepared to test any new method of treatment which appears to him to offer a reasonable prospect of yielding satisfactory results. For example, he has tried vaccine treatment for ringworm (with the assistance of O. de Jong), and reports that the use of a vaccine produced from ringworm culture prevents the development of fresh areas of infection and reduces the duration of treatment when reliance is placed upon ointments alone. On the other hand, Dr. MacKenna remains critical in the face of investigators who claim the discovery of dermatological panaceas; he is quite alive to the importance of the phenomena of focal infections and sensitization to foreign proteins in the explanation of dermatoses; in fact, he devotes a chapter to the discussion of these interesting subjects, but he exercises caution in accepting them as an adequate solution of the many etiological problems presented by the various erythemata.

Another useful feature developed by the author more extensively than we have noticed previously is the provision of diagrams or charts of the body showing the sites commonly affected by some of the commoner eruptions—for example, scabies, psoriasis, and lichen planus.

Altogether Dr. MacKenna has produced a very useful and practical work, which is the more valuable because it is written in clear and racy language, and is full of details evidently drawn from the author's own extensive experience of dermatology. Occasionally he makes use of a happy and graphic metaphor, but he avoids laboured attempts at facetiousness, which are apt to become somewhat irritating. The illustrations are numerous and practically all original: the reproductions of photographs of cases under the care of the author and his late colleague, Dr. Stopford Taylor, are very good photographs, and in almost every case bring out clearly the points it is desired to illustrate. Dr. MacKenna has avoided the lure of the coloured plate, which may occasionally indeed be brilliantly successful, but which in practice is usually unsatisfactory. Dr. MacKenna's manual, which is of reasonable size and weight, deserves commendation and recommendation.

[1] *Diseases of the Skin.* By R. W. MacKenna, M.A., M.D., B.Ch.Edin. London: Baillière, Tindall, and Cox. 1923. (Roy. 8vo, pp. x + 460; 166 figures. 21s. net.)

THE PHYSIOLOGY OF THE LIVER.

PROFESSOR G. H. ROGER, the distinguished Dean of the Faculty of Medicine of Paris, has been a life-long worker on the functions of the liver, and has made more than eighty contributions on this subject, dating from 1886, when, under Bouchard's inspiration, he began his series of publications on the antitoxic or protective action of this gland. He is therefore in a good position to give a broad review of its functions in health and disease, as he has done in his monograph, *Physiologie normale et pathologique du foie.*[2] The scope of the subject is enormous and attended with much difficulty, and the author frankly admits that the vast bibliography has not been completely covered; this is perhaps specially noticeable to English-speaking readers, for the author is not always familiar with our names and work—for example, in discussing the nerve supply of the biliary tract he refers to the conclusions of Braindbridge and Dole, and does not mention Meltzer's law of contrary innervation of the gall bladder and Oddi's sphincter at the lower end of the common bile duct, or Rous's work at the Rockefeller Institute on the secretion of bile and the function of the gall bladder. It is, however, natural that this volume should be rather a summary of an investigator's own extensive work and a correlation of it with existing knowledge than the encyclopaedic review of a critical compiler. Professor Roger is, of course, thoroughly familiar with the most recent work of the Paris school that has done so much for hepatic pathology, and constantly quotes it. As professor of experimental and comparative pathology in the University of Paris he is specially well equipped to deal with the pathological conditions of hepatic functions, and he constantly applies the results of experimental research in the laboratory to bedside practice.

After discussing the question as to the existence of jaundice due to the formation of bile pigment in parts of the body other than the liver, Professor Roger concludes that the extra-hepatic formation of bilirubin is as yet too uncertain to be regarded as definitely established. His caution is also shown with regard to the mechanism of the production of urobilin, for after tabulating five hypotheses the decision as to the correct one is left open. Provisionally three forms of jaundice are recognized—namely, obstructive, haemolytic, and that due to disordered function of the liver cells; the first includes emotional icterus due to spasm of the ducts; haemolytic jaundice is subdivided into that depending on fragility of the red blood corpuscles and that caused by changes in the liver, spleen, or other haemopoietic organs. In some instances the disordered action of the liver cells may be an excessive production of bile, as in Hanot's cirrhosis and possibly in spirochaetosis icterohaemorrhagica; in others the constituents of the bile are passed into the blood instead of the bile channels. In the section on the metabolism of fat reference is made to Professor J. B. Leathes's work and to Roger and Binet's observations on the process they call lipodieresis; fats are so acted upon by the blood and tissues as to lose their specific characters and be destroyed; in the liver and lungs this change is ascribed to a ferment lipodierase, the first modification being a transformation of saturated into non-saturated fatty acids. The glycogenic and antitoxic functions of the liver are fully discussed; and the volume, which brings together the author's work in a convenient form, can be recommended as a useful source of reference.

[2] *Physiologie normale et pathologique du foie.* By G. H. Roger. Paris: Masson et Cie. 1922. (Med. 8vo, pp. 399; 16 figures. Fr. 22.)

CAUSES AND CONSEQUENCES.

Causes and Consequences,[3] by SIR BAMPFYLDE FULLER, is a collection of essays covering a very wide field of thought. There are in all sixteen chapters and an introduction, and a random selection from the titles will indicate the very diverse character of the essays making up the book: "Liberty," "Ultimate facts in economics," "Vocabulary and grammar," "Logic," "Auto-suggestion," "The foundations of morality," "Amusement." It will be at once apparent that each of these subjects—and this applies to the whole of the collection—demands nothing less than a book for its adequate treatment; they are subjects which have been written about

[3] *Causes and Consequences.* By Sir B. Fuller, K.C.S.I., C.I.E. London: J. Murray. 1923. (Demy 8vo, pp. x + 291. 12s. net.)

by many people, and it is difficult for the reader to bend his mind to Sir Bampfylde Fuller's highly individualistic angle, since the process involves the conscious repression of masses of pre-existent ideas. This sacrifice having been made, one can walk with the author without coming to blows, although he is very often exceedingly provocative. As example we will quote from the chapter on auto-suggestion:

"Actions and utterances are commonly stimulated auto-suggestively by ideas of them. (But, having thought of a line of conduct, we may follow it automatically, being unaware of the movements that execute it in detail.) In speaking, the ideas which occur to us bring with them ideas of the words which signify them, and these ideas stimulate utterance associatively. The succession is so rapid that we may not catch it, and may imagine that we have thought in words and not in ideas that recalled them. It may be possible to think in words when thought is a memorial repetition. But intelligent thought must be in ideas, for there is nothing in words that can establish intelligent connexions through the unification of samenesses" (p. 78).

This quotation well illustrates the author's tendencies. Whether you agree with him does not matter. If you like him it will be because he has so obviously pursued his own line of thought and is quite fearless in expressing it. If you do not like it, it will be because the utterance lacks the authority of the specialist. But this is begging the question, because the attractiveness of the book lies in the fact that it enshrines just what Sir Bampfylde Fuller thinks about this and that.

Of all the chapters the most successful, from the lay point of view, are those on "The laws of the mind" and "The brain as a laboratory." They should be read consecutively, since the latter is a development from the former. They are clear in thought and in expression, but they require a certain amount of psychological knowledge for their digestion. From the professional standpoint the author does not appear sufficiently to embody the modern work of the experimental and physiological psychologists. The chapter on "The development of art" begins well: "There is a fragrance about art which seems to shield it from analysis." But, having by this sentence jeopardized the life of the whole essay (and if it had been written "the fragrance which is art defies analysis" the essay would have been stillborn), he justifies what follows by saying that: "The spirit of criticism is, however, not dismayed by the impalpable, and the appreciation—or depreciation—of works of art has become a very prominent feature of current literature." Quite so. And how much of it is fruitful? Certainly Sir Bampfylde Fuller carries us no nearer to the burning heart of the matter. "Rhythm," he says, "is not essential to music. The turns and cadences of Indian village chants are as rhythmless as a bird's song." Later in the same paragraph: "The rhythm unit of music is, of course, the bar." There the weakness of his position stands revealed. The Indian chants and the bird's song have no rhythm because they have no bars. Let Sir Bampfylde go to the early English polyphonic writers, and he will find the most free and flexible and natural rhythm, but he will find no bars in the original scores. Bars are a relatively late convention. The true rhythmic unit is the note, from which it follows that music without rhythm is no longer music. Nevertheless, in spite of its defects, and frequently unjustifiable dogmatism, the book merits attention, for it is the work of a man of wide experience, keen observation, and a truly remarkable versatility.

THE CLINICAL LABORATORY.

So varied is the technical equipment demanded in the routine of the pathological laboratory to-day that a critical selection of the riot of available methods must be welcome. Such a book is *Clinical Laboratory Methods*, by Professor R. L. HADEN.[4] An American publication, it is almost unnecessary to report that the "get up" of the volume—paper, print, and illustrations—is altogether admirable. Equally superfluous is the comment that the subject matter is up to date with the voluminous literature and that the equipment required of such a laboratory is extensive. A little more than half the book is devoted to chemical procedures related to the examination of body fluids, whilst the remainder contains a useful summary of well proved serological, bacteriological, and histological technique amply described. A chapter describing the handling of the colorimeter, the calibration of volumetric apparatus, the preparation of standard reagents, and like laboratory routine will prove not the least useful part.

[4] *Clinical Laboratory Methods.* By R. L. Haden, M.A., M.D. London: Henry Kimpton. 1923. (Med. 8vo, pp. 294: 69 figures, 5 plates. 18s. net.)

The author has been severely selective in presenting only one method for each quantitative determination and has thereby avoided any critical survey of alternative methods. While we may be tempted to regret that he who has given us so excellent a volume does not give us more, we acknowledge that his way is the true economy. And who shall quarrel with his selection where most methods are empirical and so few will survive a decade?

PHYSIOLOGICAL CHEMISTRY.

Practical Physiological Chemistry,[5] by W. W. TAYLOR, and *A Laboratory Handbook of Biochemistry*,[6] by P. C. RAIMENT and G. L. PESKETT, emanate from the medical schools of Edinburgh and of Oxford respectively. Each is avowedly based on the practical course in this subject which the authors have elaborated for their own classes, and we looked, therefore, for such a welcome break with the conventional treatment as might warrant publication. Instead we find the same material presented in the same traditional sequence. Into one hundred pages are compressed the ill assorted collection of tests and estimations of urine, blood, and digestive processes which has too long usurped the place of a real introduction to a knowledge of the part chemistry plays in living processes which is the true biochemistry. The sad truth is—and these publications form a welcome opportunity for renewing the protest—that instruction in this aggressive branch of science is cribbed and cabined by the confines of out-of-date examination syllabuses. These the teacher dare not ignore. The inevitable outcome of illogical curricula is recourse to cramming methods, and the less laborious form of cramming would appear to be to provide the student with a book into which is gathered every operation likely to be encountered in his examination to the exclusion of a connected consideration of fundamentals. The limits of the pocket are such that there is not room even for a practical treatment of the pitfalls which surround the simplest operations, and the worker whose tests will not "go right" will find no help here, whilst the brief statement of such theoretical considerations as are necessary to bind together the patchwork of experiment has led inevitably to many loose and misleading statements.

In spite of all we have said we still believe that these books will be good friends to the candidate in those hectic days before the examination, and—our sympathies being all with the harassed medical student—we will be content to suggest that, with these latest additions to the list, have we not now enough of this sort of book?

ULTIMATE PROBLEMS OF LIFE.

HUMAN life has often been described as a vicious circle without purpose or aim—a movement from death unto death. Progress thus becomes an illusion, since every advance returns to the point of departure and ends in death. Some such view is presented in a new way by Professor SIGMUND FREUD in an interesting essay, the English translation of which is entitled *Beyond the Pleasure Principle*.[7] The essay is admittedly speculative, and the author describes the development of his central theme as "the exploitation of an idea out of curiosity to see where it will lead." His aim, he says, is to show that contrasted with the life-sustaining instincts there exist still more fundamental "death-instincts" which are directed towards regression and the reinstatement of earlier conditions. He dwells on the universal tendency of organic life to return to the inorganic out of which it originally developed, and maintains that the final goal of all organic striving is to return to the ancient starting point which the living being left long ago. His argument, based upon a number of psychological data, is reinforced by biological considerations. The psychological views expressed in this essay involve some modification of those previously held by Professor Freud. But as he observes at the conclusion of his book, "Only such 'true believers' as expect from science a substitute for the creed they have relinquished will take it amiss if the investigator develops his views further or even transforms them."

[5] *Practical Physiological Chemistry.* By W. W. Taylor, M.A., D.Sc. London: E. Arnold and Co. 1922. (Cr. 8vo, pp. 71. 4s. 6d. net; interleaved 5s.)

[6] *A Laboratory Handbook of Biochemistry.* By P. C. Raiment, B.A.Oxon., M.R.C.S., L.R.C.P., and G. L. Peskett, B.A.Oxon. London: E. Arnold and Co. 1922. (Cr. 8vo, pp. 102; 2 figures. 5s. net.)

[7] *Beyond the Pleasure Principle.* By Sigm. Freud, M.D., LL.D. Authorized translation from the second German edition by C. J. M. Hubback. London: The International Psycho-Analytical Press. 1922. (Roy. 8vo, pp. 90. 6s. net.)

DISEASES OF THE EYE.

IT was obvious when the first edition of PARSONS'S *Diseases of the Eye* appeared in 1907 that we had in it a textbook for the student and junior practitioner which would become popular, because it contained exactly what was needed; nothing of importance had been omitted, and the opening chapters on physiology, elementary optics, and the neurology of vision—subjects which many students find rather burdensome—were so clearly written as to be easily intelligible to all. The book has now reached its fourth edition.[8] The text has been revised and some additions have been made; that the book nevertheless is no larger appears to be due to the use of a smaller print than in the last edition; matters of rarity are still treated as before in yet smaller print.

A chapter on preventive ophthalmology and one on the hygiene of vision are new and serve to drive home lessons which are touched upon in the sections on ocular disease. Two new coloured plates and some new figures appear in this edition. The appendix contains, among other matters, a very complete list of the requirements of the public services.

We have always considered this textbook as the best of the smaller handbooks in this or, indeed, in any other language; the new edition strengthens this opinion.

IN THE MIDST OF MISERY.

IT is often asked by laymen why more doctors do not commit their experiences to paper, meaning those intimate glimpses of human life unadorned which it is the medical man's peculiar privilege to obtain. The answer is not far to seek. Given the necessary literary power, any busy practitioner could gather sufficient material for a book out of a single day's work. But who would be interested in it? Only fellow practitioners of a like mind, but without time or ability to write. To the layman it would be only half intelligible; what he wants is a pure humanist version of the unique situations to which a doctor has special access by virtue of his calling.

Thinking that the Gaul, with his smaller measure of reticence, would do these things better than the Anglo-Saxon, we opened *Milieux de Misères*,[9] by S. COURGEY, with lively anticipation. Here is a passage at the beginning of Chapter VI: "On entering I see a woman in a large bed with black hangings. Her uterine cancer, recto-vesico-vaginal fistula, with consequent sciatica, do not give rise, however, to excessive suffering. She lies on her bed and her features give no indication of her terrible malady. Inoperable, she has been many times in and out of hospital." This passage illustrates the whole question at issue. The woman, with her inoperable carcinoma, is the very centre and core of the picture which the author proceeds to paint, yet the full significance of his very vivid description of her can only be perceived by a medical mind. Nevertheless anyone interested in humanity, whether lay or medical, will find these medico-social notes illuminating and interesting. They are sheer realism, no attempt being made to convert the situation to the uses of art, and as such must be commended, for their author is clearly a man of wide experience and ripe wisdom, and he has set down fearlessly what he has seen. The ravages of alcohol, of tuberculosis, all kinds of social evils and complaints fall within his comprehensive view. Fortunately the narratives are not disfigured by any comments; they are allowed to speak for themselves, the author reserving his conclusions for a separate chapter at the end of the book. Here he reveals himself as a deep thinking sociologist.

The book is written in French which presents no great difficulty.

NOTES ON BOOKS.

A SECOND edition of the *Grundriss und Atlas der Speziellen Chirurgie*, by Professor Dr. GEORG SULTAN, is in course of publication. The first part[10] deals in the main with the surgery of the head, neck, thorax, spinal column, and central nervous system; it contains some 40 coloured and 245 black and white illustrations. Many of the latter show such advanced stages of disease that they could more profitably be dispensed with, since for teaching the student the art of early diagnosis they are valueless. The teaching on the whole is very much the same as ours, but from the student's point of view more classification and subdivision would be welcome in order to emphasize main points and prevent waste of time in foraging through long sentences and clumsy paragraphs. Two tables for localizing signs and symptoms of lesions of the brain and spinal cord are useful. In operating for epithelioma of the tongue splitting of the cheek is recommended, and for growths far back, instead of Syme's operation, splitting of the lower jaw through the gap of the extracted canine tooth. The approach is made by means of an oblique incision extending from the angle of the mouth downwards and outwards to the point where the facial artery crosses the mandible. In discussing exophthalmic goitre attention is called to the fact, pointed out by Kocher that in the differential blood count the percentage of lymphocytes increases at the expense of the polymorphonuclear cells. In advanced cases the polymorphs fall as low as 35 per cent., whereas the lymphocytes increase to 65 per cent. There is sometimes also an actual diminution in the total white count. Leucopenia has also been observed in cachexia thyreopriva.

A book by M. LOUIS SATOW on *Hypnotism and Suggestion*[11] has been translated into English by Mr. Bernard Miall. The author produces evidence that methods of influencing others and producing trances have been known in all ages, and he gives an account of hypnosis from the remote past until the present time. The main purpose of this book, however, is to show what the author believes to be the baneful influence of suggestion in paralysing the capacity for reasoned thinking. He considers that the suggestive forces which proceed from dogmatic religion, the governmental policy of force, and economic greed have been instrumental in holding the credulous masses in subjection, and the book contains an extremely bitter and biased attack on religious institutions and education. While M. Satow regards it as a difficult task to free mankind from superstition, ignorance, and intellectual servility, he considers there is one excellent method—namely, "the complete and final renunciation of all belief in another world, and the training of mankind, from youth upwards in an atmosphere of free, unprejudiced, critical, scientific thought" (p. 228).

In New Clinical Methods for the Examination of the Heart[12] Dr. LUTEMBACHER gives a careful description of the mechanical and radiological methods commonly used in diagnosis. He excludes graphic methods in spite of their importance and interest, because it is a lengthy and difficult matter to obtain a good tracing, and its interpretation requires a certain amount of experience. All, however, should be able to interpret the polygram and the skiagram, and it is to their interpretation rather than to the technique required to obtain them that the text is devoted. The first chapter treats of the anatomy and physiology of the bundle of His, and is illustrated by excellent photographs. The chapters that follow contain a careful and exhaustive consideration of polygraph tracings of normal and abnormal hearts. Clinical features are touched upon only to show the connexion between the tracings and the various forms of arrhythmia met with in patients. The chapters on radiography offer an equally lucid explanation of the phenomena visible with *x* rays. Each morbid condition is illustrated and excellent diagrams show exactly where and why the heart has departed from the normal in every case.

The British Goat Society's Year Book for 1923,[13] in addition to articles dealing with goat breeding, milk production, and other matters connected with goats, contains the following papers of scientific or medical interest: developmental intersexuality in the goat, by Dr. F. A. E. Crow, of the Animal Breeding Research Department, Edinburgh University; sterility in goats, by Mr. H. Stainton, F.R.C.V.S.; the application of indirect calorimetry to goats, by Dr. H. E. Magee, of the Rowett Institute, Aberdeen; and goat's milk for children, by Dr. William Ker Bell.

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[8] *Diseases of the Eye.* By Sir John Herbert Parsons, C.B.E., D.Sc., F.R.C.S., F.R.S. Fourth edition. London: J. and A. Churchill. 1923. (Demy 8vo, viii+660; 21 plates, 326 figures. 19s. net.)

[9] *Milieux de Misères.* By S. Courgey. Paris: A. Maloine et Fils. 1922. (Cr. 8vo, pp. 240. Fr. 6.)

[10] *Grundriss und Atlas der Speziellen Chirurgie.* Von Professor Dr. G. Sultan. I Teil. Zweite umgearbeitete Auflage. Munich: J. F. Lehmann. 1922. (Cr. 8vo, pp. viii + 383; 245 figures, 40 plates.)

[11] *Hypnotism and Suggestion.* By Louis Satow. Translated by Bernard Miall. London: George Allen and Unwin, Ltd.; New York: The Macmillan Co. 1923. (Demy 8vo, pp. 240. 10s. 6d. net.)

[12] *Les Nouvelles Méthodes d'Examen du Coeur en Clinique.* Par R. Lutembacher. Paris: Masson et Cie. 1921. (Demy 8vo, pp. 186; illustrated. Fr. 20 net.)

[13] *The British Goat Society's Year Book for 1923.* Compiled and issued by the Honorary Secretary, Thomas W. Palmer, 5, Fenchurch Street, London, E.C.3. (Demy 8vo, pp. 117; illustrated. 1s. 6d.)

OCULAR ASPECTS OF PITUITARY DISORDERS.

BOWMAN LECTURE BY DR. DE SCHWEINITZ.

THE Bowman lecture to the recent annual congress of the Ophthalmological Society of the United Kingdom was delivered by Dr. G. de SCHWEINITZ, of Philadelphia, President of the American Medical Association. The lecture consisted of a discussion of certain ocular aspects of pituitary body disorders mainly exclusive of the usual central and peripheral hemianopic field defects.

The lecturer opened with a tribute to the memory of Sir William Bowman, and spoke also of his distinguished predecessors in the lectureship. He thought that although the disorders of the pituitary body had received much attention in this country and elsewhere, certain aspects were still worthy of further consideration.

Anatomy.

The first part of the lecture dealt closely with the anatomy of the pituitary region, and detailed the results of investigations made by Dr. Parsons Schaeffer, Professor of Anatomy at the Jefferson Medical College, Philadelphia. Elaborate *post-mortem* examinations and dissections, studied and discussed with the lecturer, led them to the conclusion that many misstatements had been made, particularly with regard to the relation of the optic chiasma to the chiasmatic sulcus. They found direct relation to hold in but 5 cases in the 125 bodies examined. The relations of the chiasma to the sphenoidal sinus, the diaphragma sellae, and the hypophysis itself were examined, and it was evident that in the large majority of cases the chiasma lay so directly over the diaphragma that pressure from growth of the pituitary body of sufficient size would bear upon the crossing chiasmatic fibres. The distance between the chiasma and the diaphragma was found, however, to vary from a potential space to several millimetres, and this factor, combined with the variable thickness of the diaphragma, made it apparent that very considerable enlargement of the pituitary body might be necessary before pressure could be assigned as the cause of visual field changes.

Finally, the vessels of the arterial circle of Willis were considered, and the lecturer showed how the anterior cerebral arteries may become "pressure cords" on the chiasma or optic nerves as the result of crowding from below. Pressure from these or other vessels might account for the production of field defects.

Possible Production of Toxins.

While the anatomical conditions might thus readily account for many of the visual field changes, through pressure or traction, or both, upon the optic chiasma, some changes, more especially the scotomata, central or paracentral, seemed to need some other explanation. The lecturer suggested as a more likely factor the elaboration of toxins from the enlarging gland; if they did exist they might reasonably be expected to attack primarily the more highly specialized fibres of the macular bundle. The possible line of attack of such toxins was considered and the lecturer then turned to the many observations made on the visual field changes, emphasizing how frequently the "typical" defects varied. The absence of bitemporal hemianopsia too often diverted attention from the pituitary region, more especially as lateral homonymous hemianopsia was far from "very rare" in disorders of the hypophysis. The various forms of scotomata were reviewed and the similarity between them and those resulting from such lesions as toxic amblyopia and tabes dorsalis was pointed out. Careful plotting of these defects was necessary in differential diagnosis, though the possible association of tabes dorsalis with pituitary disorder had to be borne in mind. The patient often applied for relief from failing vision only in the later stages of the disease, when the visual acuity of one or both eyes had much declined.

Pituitary Headache.

Dr. de Schweinitz drew attention to the "pituitary headache" as a conspicuous symptom, showing how it was often less intense than that of other intracranial lesions and less associated with nausea and vomiting. The varying structure of the diaphragma sellae must play a part in the intensity of the headache, but the lecturer urged the necessity for more general recognition of the pituitary headache as an aid to early diagnosis. Such headache might exist for a long time before any other change, and much time might be lost if the headache were treated along wrong lines, being readily attributed to an error of refraction, gastric disturbance, etc. The possible association between migraine and pituitary disorder was not held to be likely.

Pregnancy and Menstruation.

Dr. de Schweinitz spoke next of the physiological enlargement of the pituitary body in pregnancy, and showed from his own observations and those of others that it frequently gave rise to contractions in the temporal visual field. With the return of the pituitary body to its normal size the full field was regained, but repeated pregnancies might leave a permanent defect. In no case had a scotoma been found with or without hemianopsia, and the lecturer suggested that this gave support to the theory of a toxin causing scotomata, no toxin being produced in association with the physiological enlargement of the gland in pregnancy. Objections might, he said, readily be raised to such a suggestion, but they did not eliminate it from consideration as one of the possible causes. After double oöphorectomy similar changes took place in the visual fields but were permanent. No changes in pituitary function were found, and it was suggested that, as in pregnancy, the enlargement was sufficient to cause pressure or traction upon the optic chiasma but insufficient to produce general signs of changed function. The recognized tumefaction of the pituitary body at the menstrual periods could be assigned as the cause of the hemicranias, scintillating scotomata, and transient hemianopsias sometimes observed.

Some persistent types of headache, associated with various physical signs, at about the age of puberty suggested a pituitary disorder, and though such cases showed no contraction on the temporal sides of the visual fields the lecturer considered it worthy of note that relative central scotomata could be demonstrated. The optic nerve head showed congestion, and this again suggested the presence of a toxin, the change differing from that in which only physiological enlargement was presumed.

The Pituitary in Toxic Conditions.

The state of the pituitary body in various toxic conditions was discussed, and though the lecturer disagreed with the suggestion that methyl alcohol blindness depended on any pituitary lesion he made some interesting remarks upon tuberculous lesions of the gland, which he said are not infrequent and might have a bearing upon such manifestations in the eye. The interesting condition of hereditary optic nerve atrophy (Leber's disease) might, he thought, be the result of a temporary disturbance in the pituitary, whereby a toxin might be formed which damaged the nerve as a whole or its most delicate part—the papillo-macular bundle.

Diagnosis.

Dr. de Schweinitz called attention to the infrequency with which papilloedema was found, and to the peculiar waxy pallor of the nerve head, which had often been described. The *x*-ray appearances of the sella turcica were considered, and the lecturer laid stress on the fact that the pituitary body might be considerably enlarged without *x*-ray evidence of change in the sella turcica.

Treatment.

The treatment he considered under three heads—glandular therapy and medicinal treatment; radiation (with *x* rays and radium); and operative treatment. Striking results were shown of glandular therapy with thyroid and pituitary extract, alone or combined with mercurial treatment. Even when syphilis could be reasonably excluded the mercurial treatment appeared to give valuable help to the gland extract. He believed that radiation, held in high esteem by some, aided in the control of recurrence after operative treatment.

It might be a nice point to decide how long such measures should be used before resort to surgical treatment.

The lecturer spoke strongly of the necessity for frequent charting of the visual fields; it was a far surer guide to the state of affairs than repeated *x*-ray examination of the sella turcica.

Throughout Dr. de Schweinitz illustrated his findings and statements with excellent plates, both of the anatomical relations and of the visual field changes.

VOLUNTARY HOSPITALS AND MEDICAL STAFF FUNDS.

THE part of the hospital policy of the British Medical Association which seems to promote most discussion, and may perhaps find most difficulty of acceptance by the staffs of certain hospitals, is that dealing with the formation of medical staff funds. It seems well, therefore, that an attempt should be made to set forth the origin and development of the proposal, to describe the present position of the matter, and to summarize the views of the various parties in the controversy.

There can be little doubt that the question of the payment of members of the staffs of voluntary hospitals arose in consequence of the increasing intervention of the State in the treatment of disease. Thus in 1908 the Representative Meeting adopted the principle that "the services of the profession should not be given gratuitously to patients who are maintained by public funds." In 1914 the Association's model scheme for the treatment of tuberculosis was approved by the Representative Meeting, and in that scheme a suggestion for the formation of a special fund, with hints regarding mode of distribution, was included. As a result of the Report of the Royal Commission on Venereal Disease in 1915, the Council of the Association formulated a series of recommendations, including the following: that the services of all members of the medical staffs of hospitals engaged in carrying out the treatment should be paid for by the State or local authority; that special staff funds should be formed; and that certain methods enumerated might be used in the disposal of these funds. These recommendations were passed at the Annual Representative Meeting in 1916.

In the meantime the war was increasing enormously the responsibility of the State for medical treatment; and the voluntary hospitals had undertaken the treatment of soldiers and sailors suffering from diseases or injuries connected with the war. In 1917 the Report of Council extended the recommendations with regard to payment to a staff fund in connexion with tuberculosis and venereal disease, and advised their application to voluntary hospitals treating patients maintained by public funds, leaving to the staffs their voluntary status as regards purely charitable work. At the Representative Meeting at which these proposals were approved it was agreed that the question of payment for the treatment of discharged sailors and soldiers should be referred to the Council.

Between 1917 and 1918 negotiations took place with Mr. Barnes, the Pensions Minister, and three members of the British Medical Association were appointed to the Advisory Committee formed by the Ministry of Pensions. The British Hospitals Association practically adopted the policy of the British Medical Association; and in January, 1918, as the result of discussion between the Ministry of Pensions and London hospital staffs, a memorandum of arrangements was issued in which financial acknowledgement of the work done by hospital staffs for the Ministry was agreed to. The Representative Meeting in 1918 adopted the recommendation of the Council that the financial acknowledgement in the respect of discharged sailors and soldiers should be two guineas a case, or 10 per cent. of the amount paid to the institution for the maintenance and treatment of the patient. A proposal of the Council in 1919 that this remuneration should not be less than 25 per cent. of the payments to the larger hospitals, and not less than 15 per cent. of the payments to the smaller hospitals, was rejected by the Representative Meeting, which passed a resolution that when the treatment of soldiers and sailors for diseases or injuries connected with the war was undertaken at voluntary hospitals, the medical staff should be adequately remunerated. In 1920 the Council again advised that not less than 25 per cent. of the payments to hospitals should be handed over to the staff, this time in the case of all hospitals; and on this occasion the Representative Meeting adopted the recommendation.

So far we have indicated the effect of Government assumption of responsibility for treatment upon opinion in the British Medical Association and amongst hospital staffs. But at this point another factor comes into prominence. As pointed out in the Cave report, until the year 1913 the voluntary hospitals in London were able for the most part to meet their expenditure out of their receipts. With the war came a steady increase in the cost of provisions, fuel, drugs, etc., and a growing demand for an increase in salaries and wages, so that expenditure grew faster than income. The withdrawal in 1919 of many military patients, for whom a Government grant had been received, accentuated the difficulties of the hospitals. Consequently, in 1920 the governing bodies of many of the voluntary hospitals, in searching for means to increase their income, had adopted various methods for obtaining from patients, either individually or through their societies or otherwise, contributions towards their maintenance in hospital. These contributions were the more easily forthcoming owing to the high rate of wages which had prevailed during and after the war, and the consequent disappearance of a large number of the necessitous poor.

Other and less important factors in raising the demand for staff funds were the difficulty experienced by the younger members of the staffs of hospitals in making both ends meet (especially when hospital work was coming to occupy more and more of their time), and the fact that in many districts in England representatives of the working classes had obtained seats on the governing boards of voluntary hospitals, and had promoted contributory schemes in which a definite return in the way of hospital treatment was expected as a result of these money contributions.

In consequence of these developments the Council of the British Medical Association called a conference of the honorary medical staffs of voluntary hospitals with more than 50 beds, at the house of the Royal Society of Medicine on December 21st, 1920. It was attended by 138 representatives. At this conference it was agreed that persons who were not necessitous should make contributions towards their maintenance in hospital; that paying patients, who paid more than full maintenance, should arrange their fees for treatment with their medical attendants in the hospital; and that in connexion with certain classes of patients "staff funds" should be established. Thus it was at this conference apparently that the resolution with regard to staff funds which has come to be known as the Leicester resolution was carried. The terms of this resolution are:

> "That in the event of decisions being taken which would lead to patients paying in part or in whole the hospital maintenance fees, either individually or by some contributory method, or with the addition of rate aid or State aid, or by a combination of two or more of these methods, a percentage of all such payments should be passed into a fund which can be allocated in any manner which each honorary medical staff may determine."

At the Representative Meeting held in Newcastle in 1921 the Council, after calling attention to the final report of the Cave Committee appointed by the Minister of Health to inquire into the financial position of the voluntary hospitals, advised the adoption of the Leicester resolution. This was carried with the addition of a sentence excluding from the scope of the resolution those patients for whom voluntary hospitals may happen to provide accommodation as paying patients, who therefore pay more than their actual maintenance charges, and by whom fees for professional services should be payable directly to the doctor. The Representative Meeting disagreed with paragraph 50 of the final report of the Cave Committee on Staff Funds, passing the following resolution:

> "That this meeting disagrees with the following paragraph 50 (pp. 31-2) of the Report of the Government Committee on Voluntary Hospitals, and maintains that the essence of the voluntary hospital system is the independent and voluntary management and that this is in no way related to the conditions of service of the medical staff:
>
> "50. In connexion with the grants by public authorities it appears desirable to refer to the practice which obtains in some hospitals of carrying a proportion (from 10 per cent. to

20 per cent.) of these grants to a staff fund which is placed at the absolute disposal of the honorary staff. In some of these hospitals, as at St. Bartholomew's, at the Royal Infirmary, Manchester, and at the Radcliffe Infirmary, Oxford, the fund has hitherto been applied by the staff to such purposes as the purchase of expensive apparatus or books, and the support of young practitioners taking up special branches of work; but in other cases the fund has been divided among the staff. The practice is supported by the British Medical Association on the ground that patients sent by a public authority are in the position of paying patients and that in the fees paid for such patients the medical practitioner is entitled to share. On the other hand, the honorary staffs of some hospitals are unwilling to share in such a fund; and two distinguished physicians expressed the view that if the medical staffs came to be subsidized to any substantial extent 'the bottom would drop out of the voluntary system.' It should be remembered also that, although the services of the staff are honorary, they obtain a valuable return in the form of medical and surgical experience and the enhanced reputation which accrues to a member of the visiting staff of a great hospital. If the system of carrying a percentage to a staff fund is confined to cases where the full cost of maintenance and treatment is paid by or on behalf of the patient, not much objection can (we think) be taken to it; but any extension of the practice beyond those limits appears to us to endanger the future of the voluntary hospitals."

The adoption by the Representative Meeting of the Leicester resolution led the Council of the Association to call a conference of the staffs of London voluntary hospitals to discuss further action with regard to the formation of staff funds. This conference met at 429, Strand, under the chairmanship of the late Sir James Galloway, on November 16th, 1921. Eight of the large teaching hospitals were represented. The Leicester resolution was approved by 23 votes to 21. The representatives of St. Thomas's Hospital, having received no instructions, did not vote. On March 22nd, 1922, a further conference of voluntary hospital staffs in England and Wales was held at the Wigmore Hall, with Sir James Galloway as chairman. Objections to the formation of staff funds were raised by the representatives of various hospitals, both provincial and metropolitan; but the Leicester resolution was ultimately carried by 85 votes to 23.

In the meantime the Council of the Association had elaborated its hospital policy, and this was presented to the Representative Meeting at Glasgow in 1922. Considerable difference of opinion was manifested with regard to the proposals for the formation of staff funds, and an amendment was proposed in the following terms:

"That in the event of decisions being taken which would lead to patients (other than patients referred to in Sections IX (*a*) and (*b*)) paying in part or in whole the hospital charges (1) when such payments are in any part made by rate aid or State aid, and (2) where such payments in other cases are of an amount exceeding the cost of hospital maintenance and accommodation, such charges shall be considered to include payment towards maintenance and treatment, and a percentage of all such payments should be passed to a fund which is at the disposal of the honorary medical staff of that hospital."

This amendment was carried by 64 to 55; and as it was thought that the majority requisite to make it the policy of the Association could not be obtained, further discussion led to the passing of a resolution:

"That it be an instruction to the Council to reconsider the terms of the policy of the Association expressed by the A.R.M. 1921, Minute 236 (i.e., the Leicester resolution), and to report what, if any, modification may be desirable to meet any possible inequities that may arise from its operation."

In September, 1922, the Hospitals Committee considered this decision and resolved to recommend to the Council:

"That income derived from gratuitous contributions, existing assets, endowment funds, and the like, are not liable to assessment for Medical Staff Fund purposes, but all payments made for hospital benefit (other than payments made by private patients referred to in Section IX (*a*) and IX (*b*) are in fact payments towards all the services of the hospital, whether medical or ancillary, and therefore a percentage of such payments should be passed into a fund which is at the disposal of the honorary medical staff of that hospital. Small payments of individual patients not recoverable from third parties may be assessed in a nominal percentage only as a token recognition of the policy enunciated."

On October 25th, 1922, the Council approved this recommendation, which is to be submitted to the Representative Meeting at Portsmouth in July.

To sum up the present position, the British Medical Association has elaborated a hospital policy; included in this policy is the proposal to establish a special staff fund to be at the disposal of the medical staff of each voluntary hospital, and it has been suggested that to this fund there should be passed a percentage of all sums received from or on behalf of patients (other than private patients) towards the hospital costs. When the Representative Meeting at Glasgow declined to accept this proposition in its entirety, the question was referred back to the Council with a view to meeting inequities; and the Council has now resolved that such inequities are met by assessing small payments of individual patients in a nominal percentage only, using such assessments as a "token recognition" of the principle that all payments made for hospital benefit (other than those of private patients) are payments towards all the services of the hospital, whether medical or ancillary. It does not appear that this principle has been accepted by the majority of hospital staffs; and it is not clear that the Representative Meeting of the Association has accepted it in so many words. But it appears to be fundamental to the whole question at issue.

Passing now to the views which are held by the various parties to the controversy, it appears that at one extreme there is the whole-hearted supporter of the principle that all payments to hospitals by and for patients (other than private patients) are payments towards all the services of the hospital, medical and ancillary. Such a one holds that there is no justification for exploiting the doctor in the case of a person who is able to contribute to the hospital charges. He considers that the principle should be carried to its logical conclusion, that all such contributions should be assessed in a percentage for the staff fund, and that only necessitous persons should receive gratuitous services from the medical staff. In his view the assessing of such percentages does not, or need not, interfere with the voluntary nature of a hospital. At the other extreme is the man who desires to continue intact his gratuitous services at voluntary hospitals. He fears that by assenting to the proposition of a staff fund he will alter his status at the hospital—will become to some extent a paid servant of the institution. Moreover, he is in doubt whether his acquiescence in the proposal may not lead to the ultimate abandonment of the voluntary principle in hospital management. Between these two extremes there are many shades of opinion. Thus most members of hospital staffs probably feel that the State and the municipality have no right to expect gratuitous treatment for patients for whom they are responsible. Others adopt the same attitude towards employers, approved societies, contributory schemes, and so on. Others, again, feel that a distinction should be drawn between maintenance and treatment, and would only agree to contributions to staff funds where the payments by or for the patient exceeded the cost of maintenance.

It will have been noticed that in stating the various views on the formation of staff funds the question of the preservation of the voluntary system in hospital management arises. In the interim report of the Voluntary Hospitals Commission recently issued by the Ministry of Health the following definition of a voluntary hospital is given:

"An institution (other than an out-patient dispensary) managed by a responsible committee and wholly or mainly supported from voluntary sources (including income derived from endowments or investments), the object of which is to provide medical or surgical treatment of a curative character; an auxiliary institution (such as a convalescent home) being eligible for assistance (i.e., from the Commission) only in so far as it increases the facilities of hospitals from which it receives patients."

And in the earlier part of the paragraph containing the definition the Commission states: "We were clearly of opinion that voluntary management by a responsible committee was an essential condition." These words may be held to support the view of the British Medical Association, which maintained that the essence of the voluntary hospital system is the independent and voluntary management, and that this is not necessarily related to the conditions of service of the medical staffs. On the other hand it is to be noted that the Voluntary Hospitals Commission has not so far considered the question of medical staff funds; and its statement that a particular method of management is an essential condition does not exclude the possibility of other conditions, less essential perhaps, but yet calling for consideration. The point is one of the issues in the discussion.

THE CAMBRIDGE SCHOOLS OF PHARMACOLOGY, BIOCHEMISTRY, AND PHYSIOLOGY.

AT the invitation of Dr. W. E. Dixon, F.R.S., the Section of Therapeutics and Pharmacology of the Royal Society of Medicine paid a visit to Cambridge on Saturday, May 5th.

A party of about twenty arrived in the morning and first visited the department of pharmacology, where Dr. H. W. C. Vines gave an account of a chemical method he had devised for standardizing parathyroid extract. Dr. T. S. P. Strangeways showed a series of cultures of living tissues *in vitro*, and gave a short account of researches he was pursuing with these cultures. By the courtesy of the authorities of Emmanuel College, lunch was provided for the party in the college hall.

The Physiological Laboratories.

In the afternoon the party visited the physiological laboratories, where Professor Langley demonstrated a series of sections of nervous tissues and nerves.

Mr. J. Barcroft showed the party round the section of the laboratory devoted to the study of blood gases. Mr. Barcroft and his co-workers have devoted continuous attention to this subject for many years, and it was very interesting to see the refinement and perfection of technical detail and of organization which has been attained in this work. In one room was a large oxygen chamber in which any desired tension of oxygen can be produced and maintained, and in which a man can live if necessary for weeks. Another room was organized for the analysis of the blood gases in small samples of blood, and was filled with ingenious mechanical shakers and stirrers, which obviate almost entirely the tedious and wearisome hand manipulations usually associated with this class of work.

Mr. Barcroft's technique is devised largely with the aim of measuring the blood gases, using a minimal quantity of blood. An interesting contrast was provided by Messrs. Hartridge and Roughton, who showed arrangements for handling blood by the gallon, and a simple and effective apparatus by means of which the gases could be removed completely from large volumes of blood and excessive frothing avoided.

The Biochemical Department.

The party next went to the Balfour Laboratory, where Professor F. G. Hopkins showed them round the biochemical department. This department is housed in old buildings, which have been adapted to serve as laboratories, and illustrates very clearly the truth that the value of the work turned out by a department depends upon the men in it and not upon the buildings which they occupy. The building is packed with research workers, and from it has come some of the most important recent discoveries made in biochemistry. The work of Winter and Smith was naturally of particular interest to the visitors. These workers have recently shown reason to believe that the sugar in normal blood is different from the sugar occurring in diabetic blood, and are now engaged in the isolation of insulin from yeast, as mentioned in their paper published in these columns on April 28th (p. 711). This research is still in progress and promises results of the greatest importance to clinical medicine.

Professor Hopkins gave a short account of the numerous other lines of research that are being conducted in the building. These researches are largely directed towards the elucidation of problems of cell metabolism, and in particular towards determining the nature of the oxidative processes that occur in cells. A short demonstration was given of the reactions showing the presence of glutathione, the tissue catalyst recently discovered in the department.

The Pharmacological Department.

The party finally returned to the pharmacological laboratory, where a demonstration was given by Mr. Goody of the action of a sulphur compound, allied in structure to mustard gas, which produced acute oedema of the lungs when injected intravenously.

Dr. O. Inchley demonstrated the action of a constant current in causing the passage of strychnine into rabbits, and gave a short discourse on the effects produced by ionization, showing clearly that the electric current could drive drugs through the skin, but that as soon as they reached the underlying tissues they were taken up by the general circulation, so that the effect produced by the drug was essentially the same as that of a hypodermic injection.

Dr. M. B. R. Swann gave an account of some unpublished researches upon the action of x rays upon plain muscle, both *in vivo* and *in vitro*. This concluded a long and interesting programme and a vote of thanks was moved to Dr. W. E. Dixon by Dr. W. Langdon Brown, the president of the Section.

The Linacre Lecture.

Many of the party stayed to hear Sir Archibald Garrod deliver the Linacre lecture on "Some Glimpses of the Higher Medicine." Its main thesis was that a large number of diseases were due to slight individual variations in metabolism, and that the old ill defined conception of diathesis could be replaced by the conception of chemical individuality. The whole lecture stressed the great and increasing debt that medicine owes to biochemistry, and therefore formed a singularly fitting conclusion to a day spent visiting the pharmacological and biochemical departments.

This account of the day's entertainment is of necessity largely a catalogue of events, but perhaps the most important benefit of the visit was the opportunity it gave the visitors to realize upon how large a scale and with what keenness research upon the chemical functions of the body in health and in disease is being conducted at Cambridge. There is no doubt that work upon these lines will serve in the future as the foundation of a new and greater science of medicine.

THE STUDY OF FATIGUE IN INDUSTRIES.

THE publication of the third annual report[1] of the Industrial Fatigue Research Board was briefly mentioned in our columns last week (p. 779), and attention was called to the objects which guide the activities of the Industrial Fatigue Research Board. The report covers a period of fifteen months and outlines the results obtained up to the end of 1922. The serious industrial depression, which characterized the whole of the period under review, seriously handicapped the work of the Board, partly because the industrial atmosphere was unfavourable for the introduction of novel ideas and methods, and partly because employers' and workmen's organizations have been so fully engaged with urgent economic problems that they had little opportunity of giving the necessary consideration to any schemes submitted. Moreover, the variations in industrial conditions caused by short and irregular hours have introduced disturbing factors which have notably affected the progress of some parts of the work. On the other hand, that part of the Board's work which is unaffected by conditions of trade, in particular laboratory research, has actually expanded and definite results have already been secured which may eventually have an important bearing on industrial occupations.

Investigations and Researches.

The Board has aimed at the simultaneous prosecution of two separate lines of investigation—namely, research on fundamental points conducted in the laboratory, and inquiry based on observation of actual working conditions conducted in the factory. The former method may be said to show the effect of some known cause, whilst the latter suggests the cause of some known effect. Although at first the Board adopted certain selected industries as the field for investigations, it has recently taken as its objective the study of certain general subjects, not confined to any one industry but of common interest to all, following up each subject along lines which experience showed to be most promising and dealing with it both by field investigation and by laboratory research.

General Investigations.

Grouped under this heading are reported investigations on the optimum length of spell, accident causation, machine design, and sickness incidence and mortality. Widely divergent practice exists in different industries in regard to the

[1] Third Annual Report of the Industrial Fatigue Research Board. Medical Research Council. 1923. (2s. net.)

division of the working day, and the Board has decided to start an extensive investigation to ascertain the best length of spell, and the best arrangement of rest pauses, for industrial occupations of different types—from the heaviest manual labour to monotonous work involving mental rather than muscular effort.

The study of the personal factor in accident causation is undoubtedly of great importance in connexion with prevention, and the Board is conducting an inquiry by statistical and psychological methods with the object of determining—

1. How far a characteristic ratio between notifiable accidents and accidents of all kinds exists for different selected occupations.
2. The correlation of accident incidence with experience, age, and sex.
3. The extent to which special susceptibility to accident exists.
4. The primary causes of such susceptibility.

A report recently published by the Board deals with accident causation from its personal aspect; it embodies the results of two investigations—one on the relation of temperature, etc., to accident incidence, and the other on the relation of accuracy of movement to speed and duration of work.

In the design of machinery and plant full consideration is not always given to the requirements of the prospective operator. Ease of working is one of the first essentials to be taken into account in the manufacture of such articles as typewriters and motor cars, but often, where the necessity is less obvious, the manipulative side of design seems to have been somewhat overlooked in favour of the strictly mechanical side, and the Board is now considering the initiation "of a rather close inquiry into the question of design in the case of certain types of machine, in order to ascertain whether any principles can be evolved indicating the proper relationship of machine to operator."

Under the supervision of the Committee on Industrial Health Statistics an inquiry has been begun into the relative incidence of mortality, particularly mortality from phthisis, upon the residents in rural districts, and members of the same families, who have migrated to industrial towns and are engaged in particular occupations. This is being carried out at present in the diocese of Chelmsford.

Industrial Investigations.

On the advice of the Home Office the Board has made some investigations into the cotton trade, limiting its inquiry in the first instance to the weaving section; some of the results have already been published. The principal inferences which may be drawn from these researches are summarized in the report as follows:

"1. The productive efficiency in cotton weaving is both high and uniform, though differences naturally exist as between the different classes of cloth manufactured.

"2. Short time tends to have a depressing effect upon productive efficiency.

"3. During the pre-breakfast spell, in a two-break day, the productive efficiency is about 2 per cent. lower than during the other two spells.

"4. The reaction of the worker to his working conditions is masked by the predominance of the mechanical factor. When this is eliminated by calculation his working capacity is seen to undergo a gradual decrease, both throughout the day and throughout the week.

"5. The atmospheric conditions in humid cotton and weaving sheds are sometimes such as to involve working under physiological disadvantage. This is shown by the fact that above a certain limit of wet-bulb temperature the efficiency tends to fall, notwithstanding the more favourable effect on the yarn itself of the higher temperature and humidity. The cooling power of the air in humid sheds appears to be abnormally low, especially during summer, and experiments in the best method of overcoming this are very desirable.

"6. Efficiency often tends to fall under a system of artificial lighting as compared with daylight, the reduction varying in amount from 11 to 5 per cent. according to the fineness of the work involved.

"7. The initial rise and final fall in efficiency discernible in the daily work curves are not due (as is sometimes alleged) to extraneous causes, such as lateness in starting, etc., but are of subjective origin, and represent a real quickening up and slowing down.

"8. Productive efficiency in weaving is more dependent upon physical factors, such as variations in the yarn, quality of the size used, etc., than upon the variations in working capacity on the part of the operative."

Pottery Industry.

In 1920 the Board accepted an invitation from the National Council of the Pottery Industry to participate in an inquiry dealing with the construction and ventilation of drying stoves in potters' shops: the results are chiefly of technical interest, suggestions being made for preventing or reducing the escape of hot air, and on the relative importance of temperature and ventilation in the drying of ware.

Laundry Industry.

The results obtained by the study of the laundry industry reveal the facts that the atmospheric conditions in laundries compare unfavourably as regards temperature and cooling power with other industries investigated; the interpolation of short rest pauses into spells of moderate length appears to have a beneficial effect; there appears to be a lowering of working capacity in the afternoon compared with the morning, and this effect becomes more pronounced during periods when a ten-hour day is substituted for a nine-hour day; there is no evidence that laundry work, when conducted under reasonably good conditions, is detrimental to health.

Investigations are at present being carried out in the glass industry, latch and lock industry, and post office work.

Researches.

In a series of researches on the rate of recovery after exercise, Mr. H. Lupton has shown that in the case of horizontal walking and running below a certain speed the oxygen consumption increases approximately as the square of the speed; above this any increase in speed is not accompanied by an increase in oxygen consumption, the limiting rate of oxygen consumption being probably determined by the maximum capacity of the lungs and heart to supply oxygen to the tissues. On taking muscular exercise the body "goes into debt" for oxygen to an extent depending on the severity of the exercise, and most of the deficit is recovered within a few minutes of the cessation of the exercise.

"At the beginning of exercise an oxygen deficit is set up, and this is maintained until the recovery period which immediately follows cessation of the exercise. For rates of energy expenditure below the limit set by the capacity of lungs and heart, the total excess oxygen during recovery is equal to this deficit produced at the beginning of the exercise, such deficit increasing with the speed but remaining constant for any given speed, however prolonged the exercise. Hence such exercise from the point of view of the muscular machine might be kept up indefinitely. For rates of working beyond the limit set by the capacity of lungs and heart the deficit of oxygen increases with the time. In other words, lactic acid accumulates until exhaustion ensues. The limiting speed varies with the individual, being in the neighbourhood of seven miles an hour for horizontal running."

Tests for physical efficiency carried out at Guy's Hospital have shown that the "pulse ratio" (that is, the ratio between the pulse rate for the two minutes following exercise and the pulse rate at rest) is a good indication of physical fitness in the case of mild muscular exercise, but that this does not hold good for more severe exercise, such as running a mile.

Other researches being carried out by the Board include the study of the effect of rest-pauses and change of posture, the effect of atmospheric conditions, muscular control, motor capacity, accuracy of movement, monotony, coloured inks and papers, and the legibility of type.

Part II of the report contains five personal contributions from investigators working for the Industrial Fatigue Research Board. Mr. E. Farmer discusses "Some considerations concerning technique." Miss May Smith writes on "The use of the sample in investigation," and Mr. S. Wyatt contributes "Some observations on industrial conditions, with special reference to cotton weaving." Dr. Vernon is the author of two articles, one on "Atmospheric conditions and industrial efficiency," and another dealing with "Future investigations in the pottery industry." Mr. H. C. Weston contributes a note on machine design in relation to the operative.

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SATURDAY, MAY 12TH, 1923.

MEDICAL EDUCATION IN THE MELTING-POT.

SIR GEORGE NEWMAN has done a public service in issuing at the present juncture a memorandum on recent advances in medical education in England. A summary of his essay has been given in our last two issues (April 28th, p. 729, and May 5th, p. 771).

The rapidity with which the present conception of medical education has been evolved may be considered remarkable. For the first questionings whether the system of medical education in England was keeping abreast of the times we need not, for the present purposes, go back further than to the final report, published in 1913, of the Royal Commission on University Education in London, which discussed some questions and principles which are not peculiar to London. The Commission, in summarizing its conclusions, said: "The complex nature of the science of medicine and its dependence for assistance upon other branches of science necessitate co-operation, and the special organization of a professorial department, in order to enable the professor to carry on research successfully, and also to give scientific instruction in the subject. The kind of hospital organization known as the 'hospital unit' appears to us well fitted for attaining this end. It consists of:—a professor with the control of wards; an out-patient department; assistants nominated by the professor with a view to complementing his own knowledge and affording him the special assistance he requires to carry on research in the direction in which he is interested; and, finally, laboratory accommodation in close proximity to the wards, not only for the service of the wards, and the examinations and procedures connected with the diagnosis and treatment of the cases, but also for the purposes of research."

The Royal Commission recognized that there would be difficulties in the way of appointing a sufficient number of professors, but thought that some of the work might be done by the assistants to the professors and that some of the senior assistants would probably be exceedingly well qualified for this purpose. It added that this plan would give the opportunity of calling in the more experienced assistance and co-operation of members of the profession in active practice, and that this would be of advantage both to them and to the students. The financial difficulty was smoothed when Parliament agreed to make a substantial increase in the annual grant to universities and institutions of university rank. The University Grants Committee, appointed in 1919 to administer the grant, gave attention, among other subjects, to the question of clinical units, and grants for this purpose have been made.

The General Medical Council was brought into the matter of reform in medical education rather by a side wind. At its session in May, 1918, it instructed its Education Committee—in terms of a resolution submitted by Dr. J. C. McVail and Professor Elliot Smith — to inquire and report on the question whether the teaching of preventive medicine ought not to be further systematized. Sir George Newman's first memorandum was issued at the end of July, 1918, and during the following winter the conclusions of a series of discussions at the Edinburgh Pathological Club were formulated by a Committee, of which Professor Lorrain Smith was chairman, and published in the *Edinburgh Medical Journal*. The Education Committee of the General Medical Council prepared an elaborate set of questions which the Council approved and sent to the medical schools; the questions were of such a nature as to foreshadow a policy the chief feature of which would be that the whole medical course in the schools should be permeated by the spirit and principles of prevention, beginning even with the preliminary sciences and continuing through the clinical courses and into the final examinations. The questions were numerous and searching, and when the replies received from the schools were considered it became obvious that the time had arrived for reviewing and revising the whole medical curriculum. This has now been done, and the new curriculum has been in force since the beginning of the present year.

But Sir George Newman's memorandum is much more than an exposition of the Medical Council's new scheme. He emphasizes clearly and vigorously his own views on the outstanding requirements of medical education. In the recent literature of local and central administration the term "co-ordination" is often to be found, and has been used to express the desire for effective and economical relations between old and new spheres of work. Co-ordination does not mean amalgamation, but harmonious and mutually helpful co-operation, so that there shall be neither hiatus nor overlapping. Sir George Newman, however, says little about co-ordination but a deal about integration, by which we take him to mean something more than co-ordination. The dictionary meaning of integrate is "to render entire or complete; to put or bring together (parts or elements) so as to form one whole; to combine into a whole." A very fine ideal as applied to medicine in all its aspects—prevention, treatment, and scientific research; an ideal, indeed, difficult of attainment, but to be attained if we are convinced of its necessity.

Many will look first for what Sir George Newman has to say about the clinical unit, of which so much has been heard since the London Royal Commission reported ten years ago. It is fully discussed in two chapters, and there is logical significance in the order, the one on the chief needs of clinical study, and the other on university clinics (clinical units). All will agree that the needs of clinical study as they develop must be met, and that the manner of meeting them must be such as to bring their teaching to a university standard, but the clinical unit is only a means to an end; the exact plan by which the end is attained is a minor matter provided it be elastic enough to adapt itself to varying needs of the time, present and future, and of place. We want new methods, but not a violent wrench with the past; we must seek to retain all the good in the old system of medical education in Great Britain, and to strengthen it where—especially in England—changing conditions have discovered weaknesses in the machinery. This doctrine Sir George Newman develops at length, with many historical references, apt quotations, and plans for the future, the whole pervaded with a sublimated sort of common sense.

Thus while he writes "one fact is both certain and universal—the claims of clinical teaching and the need for adequate equipment for such teaching have advanced in such a way, and to such a degree, as to make

reorganization absolutely necessary," he goes on to point out that "such reorganization may well take different forms, but it must provide opportunity for effective teaching in the clinical as in the intermediate subjects." The university clinic has two purposes—the provision of education of university standard in the clinical subjects for all students, and the advancement of learning. In developing the second point Sir George Newman writes: "It is the goal of medicine which here must be striven for, it is the sum total of knowledge applicable to the betterment of man's physical estate which must be synthetized. The ordinary dispensary treats the case; the University Clinic does the same, but out of the case it should draw a liberal education and provide for the sounder and fuller treatment of all similar patients, for it should so think and work as both to train the student and extend the frontiers of knowledge and of life." Then he comes to the issue presented by the practical application of the doctrine thus enunciated, and, we believe, generally accepted. "Much expenditure and educational attention have been devoted to the sciences of anatomy and physiology, but the clinical subjects have not, until recently, received their due. All too often they have been left to the chances of incidental teaching by an honorary hospital staff, unable to devote itself principally to teaching and research. Incidental teaching of clinical subjects cannot uniformly be of university standard."

As to the details of the plan along which the university clinic is to work he keeps an open mind. There was an attempt, made by well-meaning persons unacquainted with the history of the system of medical education which has grown up in this country during the last hundred years or more, to assert that it was all wrong, that we must have a clean cut, and start afresh on a plan they prescribed. Sir George Newman has freed himself from doctrinairism, if ever he was affected by it, and frankly confesses that the aim may be reached in several different ways, though he adds a caveat to the effect that "longer experience may modify opinion, and especially so when the existing clinics have trained competent leaders for whole-time posts." Nevertheless he sees and frankly sets out the defects of the whole-time plan as applied to the clinical subjects; some of them may be diminished, as the opinion just quoted suggests, but others are inherent. It has never been strictly carried out in Germany, Austria, Switzerland, or France, and is not spreading in America, from which it came to us. Another plan which is working there in some places provides the whole-time professor with special wards and consultation rooms, where he treats private patients, the fees being paid to him direct or to the governing board of the hospital, which has an equitable arrangement with him. Another method of solving the practical problem is that by which a part-time professor or teacher has whole-time assistants, to whom some of the professorial duties are assigned; the practical application of this method at Leeds was described in our columns last year.[1] Yet another method permits the clinical professor to undertake outside private practice to an extent which will not interfere with his duties as head of the university clinic. "Such restriction may take various forms, either on a time basis or in respect of the character of the practice undertaken. An example is the Regius Professor of Clinical Surgery at Edinburgh." Sir George Newman's view is that of the four types of solution the English medical schools will be most likely to favour the last here mentioned. The real objective is to find "the best method of creating a team of clinicians who are also laboratory workers, in a unit, under the leadership of a professor who has control of beds, laboratories and out-patient department, with adequate provision as regards time, equipment, and teaching ability, in order that the clinical education of the student may be directed along lines that will produce the best treatment for patients and the advance of knowledge." We come round, therefore, to something very like the French plan when that is worked by the best men under the best conditions.

The essay is the primary concern of those engaged in medical education or in any way responsible for it, but it can be read with interest by the practitioner as an exposition of the trend of present-day thought, and will be of value to the newly entered student by giving a broad conception of the meaning of the curriculum, of why the subjects are linked together in a particular order, of the bearing of every one of them on all the rest, and of the ultimate objective of the whole, which is not merely to pass the examination required for a registrable qualification—a condition unfortunately imperative in this imperfect world—but to learn how to prevent and cure disease throughout his professional life. To that end he will continue to study after graduation, when he will no longer be pestered by examinations and examiners, but will have for his sole aim the understanding of the problems of health and disease, and the application of his knowledge and experience to the welfare of those who commit themselves to his care.

[1] BRITISH MEDICAL JOURNAL, 1922, vol. i, p. 21 (general principles) and p. 844 (detailed plan).

INDUSTRIAL FATIGUE.

EVOLUTIONARY adaptation of man to modern industrial conditions can hardly be expected to go further without damage to the race, and the imperative necessity of adapting the machine and the environment to the man is beginning to be better understood. So specialized and standardized have the processes in many trades become that the workers perform exactly the same actions in exactly the same way hour after hour and day after day, carrying out a routine whilst breathing often a moist or dusty atmosphere in an ugly building reverberating with the ceaseless clank of machinery. Increase of production has been the chief aim of our industrial age, and to obtain the maximum increase with the minimum expenditure of money the man of to-day has been trained to a degree of monotonous mechanical efficiency which rivals that of the complex machines he tends.

The amelioration of the artificial surroundings of the factory or workshop promising greater comfort to the worker, and improvement in the design of machinery to eliminate causes of accidents and to diminish risks to health, are objects which, from hygienic and philanthropic motives, have been the care of public health legislation. They are now being studied by employers of labour with a view, as is assumed, to increased production—a motive which occasionally arouses suspicion in the powerful organizations of the workmen, who fear that it may be only a fresh means of exploitation.

This atmosphere of mistrust is probably quite unwarranted, since adaptation of the machine to the individual, if successfully achieved, will benefit both employers and workmen, and the establishment of the Industrial Fatigue Research Board, whose objects are entirely disinterested and whose aims are purely scientific, has been a move in the right direction. It is an impartial authority in which both parties may have confidence. A detailed note on the Board's third annual report will be found at page 819, but we may here pick

out three examples of the services it is capable of rendering. In the weaving of certain kinds of cotton cloth moisture is injected into the air of the room. Objection has been taken to this practice, which is trying to the workpeople, especially during the hot summer months, and several committees of inquiry have sat. Evidence has been given to them to the effect that work of the type of weaving is carried out under disadvantageous conditions when the wet-bulb temperature in the sheds exceeds a limit variously given as 70° or 75° F. At temperatures approximating to these the body temperature of a worker tends to rise as work proceeds, and two recent reports to the Board have shown that "in cotton weaving the time taken by the weaver to deal with each breakage increases, within limits, as the wet-bulb temperature rises, and that in the kindred process of fine linen weaving efficiency falls to a marked degree when the wet-bulb temperature reaches 73°F." Thus amelioration of conditions in this respect is in the interest of the industry. Again, it has been found that in the weaving both of silk and fine linen the effect of even a good system of artificial lighting, as compared with natural lighting, is to reduce productive efficiency by about 10 per cent. The causes of accidents, broadly considered, form another matter of great interest, and some controversy has arisen as to the relative importance of fatigue and speed of work as factors in accident incidence. Dr. Vernon's researches indicate that speed of work is the more important factor, since the output curve and the curve giving hourly accident incidence usually correspond closely; this view is confirmed by the fact that no increase in accidents is observed at the end of a spell of work, when fatigue would naturally be expected to manifest itself.

Much may be expected in the future from a study of the design of machinery in relation to the convenience of the operative. The shape, size, and position of levers and hand-wheels, and the power required to operate them; the height of the working plane, the area which has to be kept under observation, the extent to which the operative may be required to reach both in the horizontal and vertical directions, and the number of controls, together with the order in which they are managed—all these are problems demanding investigation. Adaptation of the machine to the individual will result both in increased production and greater comfort for the worker.

NURSES' REGISTRATION.

THE Nurses' Registration Act of November 1st, 1919, laid upon the General Nursing Council the duties of forming a Register, regulating the conditions for admission thereto of such nurses as were already in practice, and of prescribing the training and regulating the examinations which should be conditions of admission for the future. Parliament gave no indications as to the admission of nurses already in practice, termed in the Act "existing nurses," except that they should have been in bona fide practice for at least three years before November 1st, 1919, "under conditions which appear to the Council to be satisfactory for the purposes of this provision and have adequate knowledge and experience."

The first Council was an appointed body. It was charged to form a scheme for the election of sixteen members on to the second Council. The second Council, formed of sixteen elected and nine appointed members, came into existence this year.

In admitting nurses to the Register the Council has required hitherto that all general nurses should have undergone at least one year's training in some general hospital. Under this term have been included small cottage hospitals. If training was to be required the conditions could hardly have been more lenient. But about a year ago complaint was made that competent nurses were being excluded by this requirement. The Council made several attempts to satisfy this complaint, but it is obliged by the Act to consult with the Nursing Councils of Scotland and Ireland, as well as to obtain the approval of the Minister. Each proposal made by the Council up to the present was blocked either by one or the other of these authorities. At present a proposed rule of the Council that nurses in practice before 1900 — after which date hospital training became the acknowledged custom—should be admitted on evidence of competence alone, is before the Minister, and if approved by him will lie on the table of the House. It is to this rule that the Committee of Medical Members of Parliament is reported to object. Their intention, it has been announced, is to propose an amendment admitting all nurses who have been three years in practice before November 1st, 1919, without requiring any hospital training, and substituting therefor testimonials of competence and an examination by the Council. It seems to us somewhat doubtful whether the latter would be made satisfactory.

The Nursing Council has also been engaged in drawing up regulations for the future. Under this head are included the approval of hospitals for training schools—obviously a difficult and invidious task—the drawing up of syllabuses relative to training and examination of every branch of nursing, and the arrangements and regulations necessary for holding simultaneous quarterly examinations at various centres throughout England and Wales. This latter is a complicated piece of business.

The scheme which was adopted for the election of the existing Council was subjected to certain criticisms in the House of Commons, and on March 14th Major Barnett proposed a large number of amendments, although only one of them raised any point of principle. The scheme for election provided that six of the eleven representatives of the registered nurses should be past or present matrons. Major Barnett's suggestion was that the registered nurses should elect eleven nurses to represent them, and that they might or might not be matrons. This, he said, followed a precedent set in Scotland. All the amendments were passed by the Minister of Health to the Nursing Council for consideration and report. It must be remembered that this Council has two main functions —the regulation of the education of nurses and the maintenance of a satisfactory register. In view of the importance of the functions of the Council in relation to education it may be doubted whether it would be justifiable to leave its constitution wholly to the chances of an open vote.

The first volume of the Register, issued as ordered by the Act as soon as possible after July 21st, 1922, contained 6,000 names. By November 24th the electorate had risen to 12,000, and about 3,000 more have been added since then. It seems, therefore, as if nurses were registering in good numbers.

THREE PIONEERS.

THE grave in which Sir Shirley Murphy was laid to rest last week in Brookwood Cemetery is within a few yards of those of two men to whom he was bound by close ties of friendship and who were equally eminent with him in the sphere of public health—Sir George Buchanan and Sir William Henry Power. It is said that the burial-place of Sir Shirley

Murphy was selected by Lady Murphy so that he might rest near his old friends. It was a fine thought. When these three were in their prime the number of medical men devoted to the practice of sanitary science and preventive medicine was a mere fraction of the total so occupied in the present day. Two of the three were at the head of the public health service in England, while the third was in a similar position for the greatest municipality of the British Empire. Buchanan—eager, a man of action, fretting against the bars of the prison in which, even when he had attained the highest office open to him, a man who gave himself to public health was then confined. Power—reserved, taciturn, contemplative with patience to wait on events, the progress of which he seemed to believe could not be hurried, only directed. Shirley Murphy—genial, ready to give himself freely, pouring out facts, opinions, questions, which his retentive memory had stored or his rapid mind was formulating. He had a great opportunity; the consciousness that he had risen to it made happy the mellow years of his retirement. These three now sleep their long sleep together under the shade of the firs in the great cemetery which retains more of nature and owes less to art than the long roadways of well trimmed plots which compose the ordinary burying places of great urban populations.

THE ROYAL ACADEMY.

AN exhibition of pictures, such as that at the Royal Academy of Arts, may offer matter of interest from a medical point of view because it contains portraits of medical men and women; or from time to time because a medical man exhibits a work of art found worthy of acceptance by the hanging committee; or because—and this is not very infrequent — an artist has introduced into his picture, consciously or unconsciously, the representation of some physical abnormality or disease. In any case the artist is commonly concerned with two subjects upon which medical men can claim some measure of expert knowledge—namely, anatomy and colour. This year's exhibition at Burlington House does not appear to contain many works by doctors; but we noticed a water-colour painting, "In a Chelsea Studio" (No. 768), by Dr. Cecil W. Pilcher. In each of the other directions, however, there is more matter for comment. In Gallery I there is a very good portrait (No. 31) of Sir Malcolm Morris in a characteristic attitude, by Mr. Walter W. Russell, A.R.A. The portrait (No. 129) of Miss Aldrich-Blake, M.S., M.D., is perhaps the best by Sir William Orpen in this year's exhibition. Mr. Edwin A. Ward exhibits a somewhat ordinary painting (No. 230) of Sir William Church, which is, however, a very good likeness. The charcoal drawing (No. 1027) of Sir Alfred Rice-Oxley, the ex-Mayor of Kensington, by Mrs. L. Anning Bell, is of average merit, but a poor likeness. Amongst the sculpture there is a bust (No. 1361) of Professor D. Greig, F.R.C.S., by Mr. George D. Macdougald, a model (No. 1365) for the obverse of the Lister memorial medal, by Mr. Charles L. Hartwell, A.R.A., and a medallion (No. 1370) of Dr. William Harvey, by the same sculptor. Sir George Frampton exhibits a bronze bust (No. 1465) of Sir John Bland-Sutton. With regard to physical abnormalities, the attention of the medical visitor will be caught very early by the unpleasant corpse-like flesh colour of the two figures in Mr. Glyn Philpot's "Little Dancer" (No. 15). Why two apparently living beings should be represented with such complexions is an enigma. Against such a travesty may be set the flesh painting in "The Entombment" (No. 2), a picture in the primitive style, in which Mr. David Poynter has attempted with success to reproduce a corpse-like colour in the dead Christ—an unusual effect. Mr. Maurice Greiffenhagen's diploma work, entitled "The Message" (No. 454), raises the question whether the painter really admires enlarged thyroids, or whether his representation of such an abnormality is due to the influence of Rossetti. There is another picture in which the abnormality is also to be detected. The examination of an exhibition of pictures from the standpoints of anatomy and colour might be a fascinating pursuit. We have heard it said that art schools would do well to confine their attention mainly to these subjects, and to leave art to be evolved by the artist. Certainly the exhibition does not want in examples of the need for closer study both in anatomy and in colour. Thus the greens in many of the landscapes and other pictures are suggestive of defect in colour vision. Take for example "Before the Ruined Abbey" (No. 259), with its spinach-like grass, by Mr. Sydney Lee, A.R.A., or "The Birth of a River" (No. 666), by the same artist, depicting, apparently, a glacier of lifeless green surmounted by a cap of dirty snow; and compare these with the greens which have accomplished their purpose in Mr. Algernon Talmage's "Morning After Rain" (No. 140) and Mr. Edward Buttar's "Wiltshire Downs" (No. 234). In No. 564 Mr. William T. Wood combines astonishing greens with trees in which the foliage resembles the painted shavings used in toy farmyards, and the wood is impossible. In "The Sisters" (No. 258), by Mr. W. G. de Glehn, A.R.A. elect, the anatomy of the neck and shoulders of the sister in pink is defective, and the suprasternal notch resembles a pit. In the background of Miss Ethel Walker's "The Invocation" (No. 627) there is a row of figures, of which that on the extreme right shows marked deformity of the hip. It is difficult to believe that in the pursuit of "line" in drawing greater satisfaction is to be derived from deformity than from health. "Tilty Church" (No. 137), by Mr. George Clausen, R.A., is defaced by a cloud with the anatomy of a bolster. The so-called pictures of the year, such as Mr. Wyllie's "Port of London" (No. 213) and Sir William Orpen's strange picture, which to many spectators is merely horrible, "To the Unknown British Soldier in France" (No. 190), present no particular medical interest. Mr. Edward Chappel's "Over the Hills and Far Away" (No. 267) and Miss Barbara Shiffner's "With 'The Grove'" (No. 668) are amusing because of the yellow carpet of sunlight spread out for a herd of cows in the one case, and the numerous green carpets for various patches of animals in the other; but that our criticism may end on a note of praise we would call attention to Mr. L. Campbell Taylor's "Priscilla" (No. 489), a work in the older Dutch spirit, to "Mischief" (No. 637), by Miss Helen Mackenzie, which is firm and good, and to the "Lady and Gentleman" (No. 646) by Mr. Alfred R. Thompson.

THE ANTIRABIC INSTITUTE IN BAGDAD.

AT a meeting of the Section of Tropical Diseases and Parasitology of the Royal Society of Medicine on Monday, Lieut.-Colonel A. E. Hamerton described the work of the antirabic institute at Bagdad. He said that in the tropics it had been usual to establish antirabic institutes in the temperate climate of hill stations, often far removed from the endemic areas of the disease and the centres of population, but it was often necessary to treat rabies on the plains where torrid heat prevailed. The use of carbolized vaccine was, he believed, the best method; it had stood the test of many independent investigations. The standardized glycerinated vaccine of Phillips, as used in the United States, seemed ideal for non-tropical climates, but apart from the difficulty of obtaining pure glycerin in the dusty atmosphere of a Mesopotamian town, contact with glycerin under these conditions rapidly killed the virus and presumably affected the vaccine. Rabies in dogs and hydrophobia in man had been recognized by medical practitioners in Bagdad long before the British occupation, and early in the war a good many cases of canine rabies were detected by the members of the army medical and veterinary service in Iraq, and the men who had been bitten were sent for antirabic treatment to the hill station at Kasauli. As the army, with its following of pet dogs, increased, and it became

known that a dog bite, real or spurious, meant the transfer of the victim from the infernal regions of Iraq to the delectable mountains of Hindustan, there seemed to be some likelihood that the forces would be seriously depleted. There was no doubt a good deal of malingering, but cases of hydrophobia had occurred, and it was not considered safe to disregard any instance of reputed dog bite. During 1919 a remarkable series of cases of hydrophobia occurred in a refugee camp near Bagdad. A rabid jackal attacked 46 prisoners; 28 of these were sent to Kasauli, but the journey was long and five of them died; of those not sent eleven died of hydrophobia in the army hospital. An antirabic institute was established in Bagdad by the military authorities, and the good result of the early vaccine treatment thus made possible was exemplified in some well authenticated cases. An Arab sheikh and his daughter, who had been bitten by a wolf, attended the laboratory at Bagdad and received treatment; eight other persons who were bitten at the same time refused to attend. Four months later the sheikh and his daughter were alive and quite well, while all the other persons had developed hydrophobia and had died. It was impossible to stamp out rabies in a tropical country because jackals, wolves, and, in East Africa, hyenas provided a natural reservoir for the virus. The first cases which occurred in a district should be biologically proved, and if the attack was unquestionably rabies, then more cases were to be expected, and due precautions should be enforced. As the preparation of a fixed virus was tedious and expensive it was convenient to obtain the strain from one of the Pasteur institutes already established, but the virus was exceedingly delicate, and during transit in a hot climate might be killed. In Bagdad it was necessary to send the virus from Kasauli in live rabbits which were successively inoculated. During the period of intense heat the virus seemed to lose its strength, and the animal died, not on the ninth or tenth day after inoculation, but on the twelfth or thirteenth. Each patient treated at Bagdad received a dose of 5 c.cm. of the vaccine over a period of fourteen days; the dose was given intracutaneously rather than subcutaneously. The needle was sterilized in hot oil between the inoculation of each patient. At the conclusion of the course the patient was given a stamped addressed postcard and requested to inform the director of the institute of the state of his health three months later. During 1921 the carbolized vaccine was used for 137 people in Bagdad, and down to May, 1922, when Colonel Hamerton left Iraq, no case of hydrophobia nor any unpleasant after-effects had occurred among those treated. The work of the institute had been continued by the civil medical administration, and only one case of hydrophobia had been reported among those who had come for treatment, a man who refused to continue the course, and received only four inoculations instead of fourteen. The cost of an antirabic institute in the tropics, if there was a well equipped laboratory already established for general bacteriological work, was trifling. The initial cost of instruments and of rabbits and rabbit hutches was from 1,100 to 1,200 rupees, and the recurring expenditure, chiefly remuneration of additional staff, 100 rupees a month.

THE ASSOCIATION OF PUBLIC VACCINATORS.

THE annual meeting of the Association of Public Vaccinators of England and Wales this year was an occasion of special interest, because it marked the twenty-fifth year of its existence. The activities and usefulness of the Association during these years were indicated in a summary of its history circulated among the members with the annual report. Dr. A. E. Cope, honorary secretary and treasurer, and a former president, gave an address on a quarter of a century of vaccination and its lessons. He referred to the great value of the work of Dr. S. Monckton Copeman, as outlined in his Milroy lectures delivered in 1898—the year of the birth of the Association of Public Vaccinators. Dr. Cope dealt with the histology of small-pox and cow-pox, and observed that the essential difference appeared to be that in small-pox the amoeboid body found in both entered on a sexual phase and invaded the cell nucleus. The country had been remarkably free from small-pox during the past twenty-five years, but the disease had by no means disappeared. Small-pox had assumed different types, attributable to variations in the source of infection. In the epidemic of 1901-2 the London visitation was severe in type, having been imported from the East; in the provinces the strain was mild and came from America. Standardized calf lymph was now available in unlimited supplies, thanks to the excellent work done at the National Vaccine Establishment. There should be uniformity in the technique of vaccination, and parents should be instructed definitely regarding the after-care of the child. Dr. F. W. Brookes of Lambeth was in the chair, and it was unanimously resolved to invite Dr. A. G. Wells, one of the oldest members of the Council and honorary auditor of the Association, to become president for the ensuing year, but the meeting heard with regret that Dr. Wells was unable to accept the honour. Thereupon Dr. Brookes consented to serve for another year. He was in the chair at the annual dinner, at which, after the loyal toast and that of the Association had been duly honoured, Dr. Arthur Drury proposed the health of the visitors. The Association, he said, had always been happy in the choice of guests, and that evening was specially so. Dr. McVail's classic *Vaccination Vindicated* had been an inspiration, and had provided the speaker with much ammunition during the twenty-five years in which he had been actively engaged in the defence of vaccination. The valuable researches of Dr. S. Monckton Copeman and his processes for the production and storage of glycerinated calf lymph had entirely changed the work of public vaccinators and rendered it more satisfactory. They had with them also that evening Dr. W. McConnel Wanklyn, whose work in connexion with small-pox and whose publications were well known. To Dr. C. Courtenay Lord (British Medical Association), Dr. James Neal (Medical Defence Union), Dr. Horner (*British Medical Journal*), and Dr. Pinkerton (*Lancet*) Dr. Drury extended a hearty welcome on behalf of the Association. In responding to the toast, Dr. J. McVail said that there was present a greater personification of knowledge of the art of vaccination than could be found in any part of the globe. The science of vaccination was personified in Dr. S. Monckton Copeman. He regarded it as a duty of the Association to instruct public vaccinators, and indeed the whole profession, in regard to the detail of vaccination. Small-pox always taught the lessons of vaccination without any equivocation. There was now more emergency vaccination and more vaccination of adults, and as the circumstances were not the same as with infants, every endeavour should be made to prevent the occurrence of "bad arms." A committee should produce a report of all the difficulties encountered. A single "bad" case was advertised by those who decried vaccination. Many years ago the British Medical Association issued a pamphlet on vaccination; it might be revised and brought up to date. He congratulated the Association on having the services of Dr. Drury to deal with the controversial aspect; if there was one man in the country who could bowl over the antivaccinator in controversy it was he. Dr. McVail went on to maintain that there had never been compulsion in this country. The law had been weakened, and it was therefore more imperatively necessary to educate the public. Dr. Copeman, who also replied, recounted some amusing experiences in a racy speech. He urged members of the Association to visit the National Vaccine Establishment. No fewer than eleven millions of tubes of glycerinated calf lymph were issued

during the war. He concluded with some practical hints concerning the vaccination of adults. The health of "The President" was proposed by Dr. E. Climson Greenwood (first president of the Association), who met with a hearty reception, and duly acknowledged.

THE WORK OF THE FRIENDS' RELIEF COMMITTEE.

THE ninth report of the Friends' Emergency and War Victims' Relief Committee describes its work in France, Russia, Austria, and Poland during the year ended March 31st, 1923. In France the emergency maternity hospital established at Châlons-sur-Marne in December, 1914, has been replaced by a permanent building given by English and American Friends with the aid of some French donations; it has been handed over to a local committee to carry on, and is intended to serve as a memorial of the work of the Friends for France. Two ante-natal consultations and two consultations for infants are held weekly. As to Russia, it is hoped that it will prove possible to discontinue the famine relief work immediately after the next harvest. The deplorable conditions existing in the district of Buzuluk were described in the report for last year. The population cared for then was about 454,000; it had been reduced by last summer to about 336,000, "or, in other words, in an area roughly the size of Yorkshire and Lancashire, every third person had died." Before the last harvest about 257,000 people were being fed; at the harvest the number dropped to 65,000; later on it rose again to 103,000, and would, it was anticipated, increase to 150,000. Help has been given both by gifts of clothing and by the introduction of agricultural machinery. The health conditions, it is stated, have materially improved, although malaria has been rampant. Under the direction of the Committee's medical officer, Dr. M. D. Mackenzie, an epidemic hospital at Buzuluk has been reopened, and ten other hospitals have received equipment and food to enable them to begin their work again. The feared epidemic of cholera did not occur, but cholera vaccine sufficient for 100,000 persons was distributed to the local doctors. A sanitary guard has been established at Buzuluk station to watch for cases of typhus, and a bacteriological laboratory has been set up. Russian doctors have taken a responsible share in the work, and arrangements have been completed for them to carry it on after the mission leaves, as is intended, during this summer. The confidence in Austria, restored by the determination with which the League of Nations scheme for financial reconstruction is being carried out, will, it is hoped, enable the commission in that country to be withdrawn this summer. The mission has continued its care of tuberculous, rachitic, and under-nourished children by subsidizing their maintenance in homes. The difficulty of obtaining fresh milk for children and sick people in Vienna has been met by establishing a system by which cows are imported and handed over to farmers in the neighbourhood of Vienna who undertake to deliver stated quantities of milk daily for a period of eight months, until the cow has paid for herself in milk and so belongs to the farmer. Over 1,000 cows have been disposed of in this way. The quantity of milk distributed daily in April, 1922, was over 4,000 litres. Special milk in sealed bottles is supplied to 2,000 infants, and since last summer children's institutions have been supplied with fresh milk at one-third of the market price. This accounted for 1,500 litres, and about 4,000 more were delivered daily to individuals, including 1,000 to patients from tuberculosis dispensaries. During February, 1923, about 7,000 litres were distributed daily to children and tuberculous patients. Altogether some 14,000 persons in Vienna and the provinces were daily receiving milk from the mission's cows. All this, of course, meant a big organization; there were 47 distributing centres in Vienna. The Committee, as we understand, intends to close its mission in Poland this summer, after three years' work. Welfare centres have been established in several towns, and are now being administered by Poles, as is also the school of gardening at Dykainow.

THE INDUSTRIAL COLONY IN THE TREATMENT OF TUBERCULOSIS.

THE spring meeting of the Border Counties Branch of the British Medical Association was held on April 20th, at Englethwaite Industrial Colony, by invitation of the Cumberland County Council. A tour of inspection of the Colony was made during the afternoon, special attention being paid to the poultry farm, the joinery shop, and the other branches of industry in which the patients are engaged. Afterwards an address was given in the recreation hall by Dr. P. C. Varrier-Jones, of Papworth Industrial Colony, Cambridge, Dr. W. Scott, Ruthwell, Dumfries, president of the Branch, being in the chair. Dr. Varrier-Jones said that Papworth was the pioneer institution of the kind in England. Beginning in temporary work as a tuberculosis officer he sat at a desk, and to one patient he would recommend "a light job," to others "a generous diet and plenty of cream." Quite suddenly, one day, he was told that what a patient desired from his doctor was hope, and he thought over again the advice he had given to his patients. If a light open-air job existed, there must be light wages at the end of the week, and he found that he had been advising men to do something which, if coupled with good wages, did not exist. He began to wonder whether it would be possible to give a man an opportunity of living under conditions in which disease, partially arrested in a sanatorium, could continue to be arrested during the remainder of his days. In Cambridgeshire the assistance of the friendly societies was invoked, the Cambridgeshire After-Care Association was formed, and the institution at Papworth begun in quite a small way. It had to be realized that the ordinary working man was not nowadays a craftsman—the craftsman's days were over, for an "engineer" now minded a machine, and a "bootmaker" did only six inches of machine sewing to a boot which went through seventy separate people's hands. The consumptive workman had to be subsidized, but this subsidy was an insurance by the community against infection. Public opinion was with the Papworth scheme, and tuberculosis was there treated right down to its very base in the home. The wives and families of the men were there, but so far there had not been one case of infection.

THE THIRD JUBILEE OF THE MEDICAL SOCIETY OF LONDON.

As already announced, the 150th Anniversary Dinner of the Medical Society of London will be held at the Hyde Park Hotel on Tuesday, May 15th. The principal guest will be the Prince of Wales. The toast of "Medicine and the Medical Society of London" will be proposed by Mr. Lloyd George and responded to by the President, Lord Dawson of Penn. The toast of "The Sister Professions and the Guests" will be proposed by Sir John Bland-Sutton, F.R.C.S., and responded to by the Lord Chief Justice (Lord Hewart) and by the Minister of Health (Mr. Neville Chamberlain). Fellows and their guests will pass through the grill room entrance and will be received by the President at 7.30. It is requested that at 7.45 Fellows and their guests will take their places at the dinner tables in order that the audience may be seated before the arrival of the Prince of Wales. The history of the Medical Society has often been told. It was founded by Lettsom with Dr. John Millar as president and Lettsom as treasurer. The first meeting was held in May, 1773. Two years later Lettsom succeeded to the presidency, and there can be no doubt that it was mainly through his influence and generosity that the Society survived, the only one of many founded about that time. It is

interesting that among the guests at the dinner next week will be a member of the Lettsom family. Dr. John Fothergill, though not a member of the Society, was a friend and patron of Lettsom, who in 1784, soon after Fothergill's death, founded a Fothergillian gold medal in his honour; the family will be represented at the dinner by Dr. Fothergill. Among other guests are the presidents of the Royal Colleges of Surgeons of England and of Ireland, of the British Medical Association, of the Royal Society of Medicine, and of the Royal Academy; the Minister of Health, Professor Sir Clifford Allbutt, and Professor Sir Archibald Garrod, the Bishop of Birmingham, Sir John Goodwin, Sir William Leishman, together with Sir Alfred Yarrow and many other representatives of science.

THE HOSPITAL POLICY OF THE ASSOCIATION.

We publish this week at page 835 a letter from the Chairman of the Hospitals Committee of the Association, and at page 817 a short history of the events which have brought the discussion of hospital policy to its present position. The correspondence has served a useful purpose by enabling the protagonists to put their divergent views before the profession in their own words, but it cannot profitably be continued. The next, if not the final, word is with the Representative Meeting at Portsmouth in July, which will have before it the report on the subject embodied in the Council's annual report published in the SUPPLEMENT of April 28th.

THE Association of Surgeons of Great Britain and Ireland met in London on the last three days of last week; Mr. Raymond Johnson presided. The Association does not permit publication of a report of its proceedings, wisely no doubt, in order to encourage freedom in debate and frankness in criticism. On Saturday morning demonstrations were given at the Royal College of Surgeons by Sir Arthur Keith, F.R.S., and Professor S. G. Shattock, F.R.S.

THE Croonian lectures before the Royal College of Physicians of London will be given by Professor J. B. Leathes, F.R.S., on the subject of the part played by fats in vital phenomena. There will be four lectures, which will be given at 5 p.m. on Tuesdays and Thursdays, beginning on June 7th.

THE annual oration before the Medical Society of London will be given on Monday next, May 14th, at 9 p.m., by Dr. J. Walter Carr, who has taken for his subject "Life and Problems in a Medical Utopia." The guests will be received by the President, Lord Dawson of Penn, at 8.30, and the lecture will be followed by a conversazione.

KING GEORGE V, when Prince of Wales, was an honorary Fellow of the Royal Society of Medicine. We announced some time ago that the Prince of Wales, having consented to accept the honorary fellowship, had been duly nominated and unanimously elected. On May 4th, at St. James's Palace, he received the diploma at the hands of the president, Sir William Hale-White, who was accompanied by the honorary secretaries, Dr. A. M. H. Gray and Mr. Girling Ball, and the secretary, Sir J. Y. W. MacAlister.

AMONG those upon whom the University of Cambridge will shortly confer honorary degrees are Dr. W. H. Welch, director of the School of Hygiene, Johns Hopkins University, Baltimore, and Dr. J. T. MacCurdy, formerly of the same university, but now lecturer in psychopathology in the University of Cambridge.

EXCHANGE PROFESSORS.

VISIT OF SIR HAROLD STILES TO BOSTON.

AN interesting precedent has been established by the recent visit of the Regius Professor of Clinical Surgery at Edinburgh University to Harvard to act temporarily in the place of Professor Harvey Cushing. Sir Harold Stiles, who has just resumed his regular duties in Edinburgh, carried out for the last fortnight of the Harvard session the teaching in clinical surgery at Boston and the duties of surgeon to the Peter Bent Brigham Hospital in that city. The system of "exchange professors" has been in vogue at the Harvard School for eight years, and while Sir Harold Stiles was in temporary occupancy of the Chair of Surgery, Professor Connor, from Cornell University, New York, acted for a fortnight as "exchange professor" in Medicine. The practice is one which presents great opportunities of new experience both to professor and students, and it is hoped that Edinburgh University may show reciprocity by welcoming an American professor for a short period to one of its chairs.

The Harvard Medical School presents some interesting contrasts to the Edinburgh system. In the first place the number of students is limited to 120 entrants in each year. A further process of selection is exercised by means of a preliminary science examination; the early science subjects are studied apart from medicine, and after the examination in these is passed the medical course proper lasts four years. In addition to this at Harvard the entrants for medicine are selected from those holding degrees of the best recognized universities in the States.

As regards facilities for clinical study, Boston is particularly favoured by the large number of well equipped hospitals in the city. This is largely due to the fact that all classes of the community have recourse to hospital for treatment and that the hospitals are well supported by the charges levied on the more affluent patients using them. The Peter Bent Brigham Hospital contains 226 beds, and here the surgeon-in-chief and physician-in-chief respectively are Professor Harvey Cushing and Professor Henry A. Christian of the Harvard Medical School. The Massachusetts General Hospital has 358 beds and the Boston City Hospital 1,209 beds. Between these three general hospitals the students are apportioned for clinical study and instruction and there are some ten affiliated special hospitals for infectious diseases, mental diseases, diseases of the eye, diseases of the ear and throat, diseases of children, etc., where students may take the elective courses to be mentioned later. As examples of the extent of equipment it may be mentioned that the teaching staff of professors, assistant professors, instructors, etc., on the active list of the Harvard Medical School numbers 102, and that in the Boston City Hospital, besides the ordinary pathological and *x*-ray laboratories, there are special laboratories for the study of haematology, of asthma, of pneumonia, of renal function including nephritis and diabetes, of physical therapeutics, and of immunology.

The method of whole-time appointments, towards which there was at one time a movement in America, is not carried out at the Harvard Medical School. The surgical staff of the Peter Bent Brigham Hospital consists of the surgeon-in-chief, Dr. Harvey Cushing (who gives special attention to surgery of the nervous system); the surgeons, Dr. David Cheever and Dr. John Homans; the urological surgeon, Dr. William C. Quinby; and the surgeon for out-patients, Dr. Elliott C. Cutler; in addition to their ordinary hospital duties they have their private cases in the hospital also. They are assisted by associates and by five resident surgeons who live in the hospital; their ultimate intention is to specialize in surgery, and they hold the appointments indefinitely but usually for a period of several years. Lastly there is a group of six recently graduated house officers who take the case histories, help at operations, and in the case of the two juniors, colloquially known as "pups," attend to routine examinations such as that of the blood, urine, etc.

A few words may be said next as to the means of mutual instruction practised by the staff; it forms a feature much more distinctive of American than of home hospitals. A strong effort is made to unify the staff by the utmost

possible amount of co-operation and co-ordination. Thus all its members, visiting and resident, meet daily at lunch in the common room. On one day in each fortnight the whole surgical staff go to the medical side of the hospital, where there is held a two-hour clinic and open discussion upon the borderland cases which have previously been carefully worked up; and on a day in the intervening weeks the process is reversed and the medical staff receives a clinic in the surgical department. A similar arrangement is made at intervals between the staff of the Peter Bent Brigham Hospital and that of the neighbouring Children's Hospital, which is also a department of the Harvard Medical School. Every Monday the radiographer spends an hour in demonstrating to the assembled staff the radiograms produced during the preceding week; and a similar critical demonstration is held once a week in the pathological department. All these meetings in a well equipped hospital have the inestimable advantage that the hospital affords post-graduate instruction to the staff as well as constituting a teaching centre for students.

Finally there are some striking points in the curriculum for students at Harvard differing from the course of study usual on this side. There is a general disposition to recognize that the duty of a medical school is in the first place to turn out men who will be efficient general practitioners, while at the same time it holds out the possibility of wider qualifications to those who desire and are able to assimilate them. It is admitted that for the average student the medical course has been made too full, so that too little time has been available for self-education. Accordingly the 1,300 hours of compulsory study previously demanded in each academic year at Harvard have been reduced to 900 by a process of cutting down all round. For example, in physiology 230 hours are now requisite instead of 320 as before, and of these only 30 hours are spent in attending didactic lectures. Demonstrations and "talks" to sections of the class have to a large extent taken the place of didactic lectures. At the same time overlapping of different departments is prevented by prescribing a syllabus for each, so that histology, for example, is included in the subject of anatomy, and the physiology of digestion is relegated to the department of biological chemistry. The saving of hours which has been effected enables some 15 per cent. of the best men in each year to take out special "elective" classes, and these men are encouraged at a later stage to specialize in the departments to which they have devoted special study.

A feature of the Harvard clinical teaching which deserves consideration elsewhere is the "intensive" system. This consists in taking the students in small sections of six at a time; they spend the whole working day for a limited period of a few weeks at clinical medicine or clinical surgery as the case may be, and then make way for another section of the class.

A word may be said in conclusion as to the way in which the Peter Bent Brigham Hospital is supported, since this is typical of the American general hospital. Of the patients treated in hospital during 1922, 58 per cent. were paying patients, by which is meant that they paid the regular rates, not necessarily the full cost; 20 per cent. paid something, but not full rates, and 22 per cent. made no payment. Private patients are divided into two classes—those who can afford to pay full charges, and those of small means for whom the schedule of charges is lower. A statement by the Superintendent may be quoted: "If it were not our custom to ask all patients to assist the hospital by paying what they can, we should be unable to do nearly as much for them as we now do. How important this is may be shown by the following figures, that of the total sum expended in 1922, only 35 per cent. was received from the income of endowed funds. The other 65 per cent. was collected from the patients, and no hardship whatever placed upon them."

THE Mackenzie-Davidson memorial lecture will be delivered by Dr. A. W. George, of Boston, Mass., at a joint annual meeting of the Röntgen Society and the Electro-therapeutic Section of the Royal Society of Medicine, to be held at the Royal Society of Medicine, 1, Wimpole Street, W.1, on Thursday next, May 17th, at 5.30 p.m. The subject selected for the discourse is the pathological gall bladder. A dinner will be held the same evening at the Langham Hotel at 8 o'clock.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

Mental Treatment Bill.

SECOND READING DEBATE IN THE LORDS.

Statement for the Government.

THE Earl of Onslow moved, on May 3rd, in the House of Lords, the second reading of the Mental Treatment Bill which was introduced as a result of a conference arranged last year by the Board of Control of chairmen of visiting committees, medical superintendents of mental hospitals, and a number of specialists; the conference decided to ask the Government to introduce legislation permitting treatment without certification in institutions approved by the Board of Control. At present the law as to lunacy might be divided into three definite parts. The first dealt with detention to prevent lunatics injuring themselves or other people; the second was devised for humane and proper treatment of such patients; and the third to secure their property against fraud or misappropriation. The Lunacy Law did not deal exhaustively with cure, the reason perhaps being that scientific knowledge of treatment was not sufficiently advanced when the principal Act was passed. The importance of this aspect of the matter was made evident in the fact there were now 120,000 certified lunatics in 172 institutions, costing £6,000,000 a year. To these were added 22,000 fresh cases every year, of whom 32 per cent. were discharged as recovered. Besides certified lunatics there were 150,000 feeble-minded persons and, in addition again, a percentage of the population (some people said as high as 10 per cent.) was dull and backward mentally. Lastly there were the cases of neurasthenia and psychoneurosis. All this constituted a serious drain on the nation's capacity, and much of it was preventable by careful watching and early treatment. As the law stood it was, at least, very difficult to provide for treatment of incipient mental disease without certification, and there was a strong feeling against certification if avoidable. This led to delay in proper treatment until too late.

The chief purpose of the bill was to provide that a patient suffering from incipient mental disorder might be received for treatment without certification. Such course had been taken for many years in Scotland, and in this country, under the Act of 1890, voluntary boarders had been allowed in private licensed houses. The desire, of course, was to surround the proposal in the present bill with every possible safeguard against misuse. First of all the institution in which the patient was to be received must be approved by the Board of Control and under frequent inspection by that body. Secondly, there must be a recommendation from two doctors. Thirdly, no patient could be admitted unless it was at his own request—a voluntary request. There were many cases of incipient mental disease in which the persons were incapable of volition; before such a person could be admitted, the recommendation of the two doctors would have to be countersigned by a justice of the peace, or a minister of religion personally acquainted with the patient but not related to him, and the person signing this document must have seen the patient and have satisfied himself that he was incapable of volition. A similar procedure was required in the case of minors, and, of course, in addition the consent of the parent or guardian must be obtained. One at least of the doctors must be a medical man approved by the Board of Control. The patient would go into the institution at first for a maximum period of six months, which might be extended for another maximum of six months. If he were not recovered within a year, the ordinary provisions of the law would apply, but at any time during the year he might leave the institution by giving forty-eight hours' notice, or he might be discharged by the superintendent or by order of the Board of Control.

Lord Onslow next touched upon the places which would be provided for the treatment of such patients. Under Clause 1 (3) county and borough councils, acting through their visiting committees, would be able to receive patients into their own institutions. Under Clause 4, visiting committees should be able to arrange for general hospitals to receive patients of this kind, these bodies working in conjunction with the committees. If this could be done, great advantage to patients might ensue by getting them away from contact with certified cases, and it would enable all the resources of medicine, other than those provided especially for mental disease, also to be at the disposal of the patient. The patient could, moreover, be received in registered hospitals which were mostly charitable foundations or licensed houses which were otherwise known as private asylums. Another provision of the bill enabled visiting committees to provide out-patient treatment for persons suffering from mental disorder. They would be at liberty to do this either in institutions under their own control, or by arranging for it to be done in general hospitals in the same way as the

would be empowered to arrange for in-patients. An outdoor clinic for nervous and mental cases was already established at the Radcliffe Hospital, Oxford, with the greatest possible success. No difference was made between nervous and mental patients. They all went to the same hall for treatment. It had been found that patients and their friends were much more ready to come to a clinic of this kind than to a separate mental hospital. The bill would also authorize visiting committees to make provision for the after-care of patients. It had been found that many discharged as cured broke down again unless carefully and kindly looked after in subsequent months.

Despite the advance made in knowledge of mental disease during the last quarter of a century, many of the causes of mental illness were largely unknown. Therefore in Clause 2, Subsection (5), provision was made for more systematic research, and for the expenditure of public money on research undertaken with the approval of the Board of Control. The bill involved the extension of the functions of the visiting committees, and it was therefore proposed that a portion, not exceeding one-third, might be persons who were not members of the council. This was the principle adopted in regard to education committees and some others, and was designed to enable the committees to co-opt experts, and to get the services of people willing to give a large part of their time to such work. At least two members of these visiting committees would be women, and power was given to the committees to carry on their duties jointly with other authorities. The expenses of visiting committees were to be defrayed by the local authorities. The cost of maintaining cases treated for incipient disease would not be a charge on the Poor Law. The cost would fall on the general fund and not on the boards of guardians.

The Mental Deficiency Act of 1913 greatly increased the amount of visiting and raised the number of commissioners to eleven. At present there were seven commissioners, one a woman who, being neither a lawyer nor a doctor could not pay statutory visits. In the view of the Ministry of Health, many of the visits and work now done by the commissioners could be undertaken by the inspectors. It was proposed to limit the number of commissioners to eleven, and to allow the rest of the work to be performed by inspectors.

Discussion.

Lord Buckmaster, while welcoming the bill, was not certain that its provisions would be fully effective. In the early stages of mental disorder there was peculiar, almost insane, resistance to any form of treatment or control. Consequently, he should be surprised if, when people had been recommended and had been placed under control by virtue of this bill, the forty-eight hours' notice were not given very speedily, and the whole benefit derivable broken down. There should, he thought, be greater power for the treatment of these cases—with proper safeguards. If persons were suffering from infectious diseases there was power to isolate them in the interests of the community. He thought that somewhat similar power might be given here; in his opinion the time had come when the whole question of the propagation of the mentally weak and unsound should be the subject of full investigation, and he wished that the Government would have the courage to appoint a Royal Commission on the subject.

The Bishop of Worcester warmly commended the bill. He thought that as the term "mental hospitals" replaced "asylums" the fear of treatment in such places would be relieved. Dr. Pearce paid a tribute to the medical staffs of these homes and he went on to deplore the effort made in certain sections of the press to cover them with abuse.

Earl Russell, in supporting the bill, commended the provision for expenditure of public funds upon after-care. In regard to the need for the main proposal in the bill, a distinguished alienist had said to him "our treatment in lunacy is just about as sensible as if we did not begin to treat a patient for scarlet fever until he was in the peeling stage." He shared the view of Lord Buckmaster that the benefit of the bill was liable to loss from the forty-eight hours' notice. He suggested that discharge should be subject to an order of the Board of Control. They were a public body and could have no pecuniary or personal interest in the detention of anyone.

The Earl of Onslow, replying, expressed pleasure at the reception given to the bill. He was unable to say anything at present on the appeal made to him against the forty-eight hours' qualification, for to remove it would be taking a very considerable step. He promised, however, that all amendments should have full attention.

The bill was then read a second time.

National Health Insurance Finance.

Sir Worthington-Evans inquired, on May 2nd, what were the amounts of the Reserve Value Contingency Fund and the Control Fund, respectively, at the end of 1921, and against what liabilities each of these funds had been accumulated; and whether any part of them was available for medical benefit or to supplement payments made to the panel doctors.

Mr. Chamberlain said that there was no fund called the reserve value contingency fund, and it was assumed that reference was made either to the Reserve Values (Apportionment) Account, or the Reserve Suspense Account. The Reserve Values (Apportionment) Account was applied in accordance with the provisions of the Insurance Acts in discharging the liabilities of the Minister to approved societies in respect of reserve values created under the Acts, and could not be applied to any other purpose. The amounts carried to the account were periodically apportioned among approved societies, but at the end of 1921 there was a balance of some two million sterling in the account not apportioned pending determination of the precise amount of reserve values to be created under Section 16 of the Act of 1920. The net amount standing to the credit of the Reserve Suspense Fund at the end of 1921 was approximately £389,000, but this was merely a provisional balance pending completion of adjustments for the purpose of giving financial effect to the changes of membership that had occurred since the date of the last valuation. When these adjustments had been carried out, it was anticipated that the balance would be negligible. The Reserve Suspense Fund was constituted of the amounts transferred from approved societies and from the deposit contributors' fund on the cessation of insurance by members of societies and deposit contributors as the case might be, and had to be applied, as far as it was sufficient, to provide the reserve values required in respect of persons coming into insurance, and of deposit contributors becoming members of societies. The amount of the central fund at the end of 1921 was approximately £2,000,000. The central fund was established under the National Health Insurance Act, 1918, for the purpose of meeting the residual part of any deficiencies at valuation remaining over (after the available contingencies funds of the societies concerned had been exhausted) in cases where the joint committee were satisified that the deficiency was due to an abnormal rate of sickness attributable to certain specified causes, or to any other special cause beyond the control of the society or branch. By the Insurance Act, 1922, the fund was liable to make good to the benefit funds of approved societies seven-ninths of one-third of the sums paid out of those benefit funds towards the additional payments in respect of the cost of medical benefit and the expenses of administration of medical benefit provided for by that Act up to the end of 1923. Having regard to the existing liabilities of the fund, it could not be regarded as in any respect available for any other purpose.

Combined Public Health Appointments.—Mr. Gavan Duffy on May 7th asked whether the Minister of Health, before sanctioning the appointment of a medical officer of health for the urban district area of Frizington, Cumberland, would consider the recommendation of the medical officer for the county of Cumberland that several small urban areas should be combined under one full-time medical officer. Lord Eustace Percy, for Mr. Neville Chamberlain, said that no formal request had been received, but the Minister had tried to arrange for such appointment by agreement. Having been unsuccessful, he did not think it practicable to object to the district council's proposal to appoint a part-time officer, but such officer had been required to give a written undertaking to resign the appointment in the event of a whole-time officer being appointed. Mr. Gavan Duffy asked if the Minister was aware that the doctor nominated for the appointment did not live at Frizington, and Lord Eustace Percy said that if information to this effect were given inquiry would be made.

Answers in Brief.

The proposal to amalgamate the naval and military hospitals at Hong Kong has been rejected by the Admiralty, and also by the committee appointed by the late Government to deal with the possibility of amalgamating the Services common to the Navy, Army, and Air Force.

Uncertified deaths in 1922 numbered 5,487.

The total amount of the grants paid to Scottish local authorities in the year 1922-23 in aid of their expenditure in the treatment of tuberculosis was £289,998 15s. 6d. The provision made in the 1923-24 estimate of the Scottish Board of Health shows no reduction on that figure; the amount provided for payment of grants in 1923-24 is £290,000.

The Minister of Health had undertaken carefully to consider the question of including in the next bill to amend Health Insurance Acts a clause to enable insured persons, no longer employed, between the ages of 65 and 70, to remain entitled to medical benefits on payment of a weekly contribution sufficient to cover the cost of that benefit.

In reply to a question on May 2nd, the Minister of Health said that he was unable to state that the sporadic outbreak of small-pox in the North Midlands had been arrested. Probably the infection was introduced from abroad, but no definite evidence was available. Memoranda upon the steps requisite to be taken on the occurrence of small-pox had recently been issued by the Ministry to all sanitary authorities and boards of guardians throughout the country. He did not think it practicable to take any other steps to guard against further outbreaks.

Mr. Ponsonby has elicited the information that no representations arising out of the discussion in the House of Representatives last January have been made to the British Government by the United States Government as to the necessity of limiting the production of opium to the amount actually required for medicinal and scientific purposes.

The Minister of Health has stated that he hopes shortly to reach a final decision as to the establishment of additional tuberculosis settlements such as those at Papworth Hall, Cambridgeshire, Barrowmore, Cheshire, and Preston Hall, Kent.

ROYAL MEDICAL BENEVOLENT FUND.

THE annual meeting of the Royal Medical Benevolent Fund was held at the Royal College of Physicians on May 7th, under the presidency of Sir THOMAS BARLOW.

The CHAIRMAN said that the objects of the Fund were twofold: firstly, to provide annuities for necessitous practitioners who had passed the age of sixty, and, secondly, to give emergency grants to medical men and to their widows and orphans who were in urgent need. In addition there was the very important Guild, founded by Lady Tweedy and managed by ladies, which helped materially in the investigation of claims and in the raising of funds. During the year under review 168 annuitants had each been allotted a sum of £20—not a large amount, but it was hoped later to be able to increase it to £26. During the war and subsequently a special fund had been raised to help patriotic doctors who, in army service, had sacrificed a considerable part or even the whole of their practices. Most of the £30,000 which had been raised had now been expended, but the Fund was still under obligations with regard to charges for the education of children of the medical men concerned. In 1922 the income of the general fund from subscriptions was £3,503, and the expenditure in grants £4,966. The income from investments was £4,166, and the annuity expenditure £4,458. The total deficit was thus £1,754. The demands had been very heavy, and the number of new applicants nearly double that of previous years. The total number relieved was 483. Although the Fund was mostly maintained by medical men, he looked for some help from the intelligent lay public who realized the obligation of the community to the medical profession.

The ARCHBISHOP OF CANTERBURY said that he was genuinely grateful for the privilege of speaking for those outside the profession. Members of the general public had comparatively rare opportunities of expressing their sense of the value of the services rendered to the whole community by doctors. Politicians, soldiers, and sailors gained applause on various occasions of public interest and importance, but he did not know of a single instance in which medical men had received a cheer. Those who had intimate acquaintance with members of the profession were aware of the hardships the war had brought to many of them. Men returned after years of service, having contributed splendidly to the common good, to practices diminished or disappearing. He could bear witness from his personal experience to the way in which service of the highest possible skill was given in medicine and surgery for the alleviation of suffering quite freely as a matter of public spirit and kindheartedness. Such services were quietly rendered and quietly received, and from the very nature of the case the public did not hear of them. He felt that many of the lay public would desire to repay in some way the debt they owed to the profession. The Fund showed the need to be obvious and provided the channel.

Lord SUMNER (Lord of Appeal), in seconding the motion, said that there were two things the public hardly realized with regard to medical men—namely, that the profession was not a rich one, and that it was a profession in which very few opportunities were given to the average man of successfully using to the best advantage such money as he had. The life of a doctor in a manufacturing district, for example, always appeared to him to be one in which the maximum of dreariness and drudgery was heaped upon a man whose labours demanded—and, one would have thought, entitled him to—the maximum of relaxation. It was a life in which very often there were only two earthly sources of consolation, the one the consciousness of good work done, and the other the family life. If, however, that family life was clouded by the knowledge that should any illness befall the breadwinner it would go very hard with his dependants, it was a very sad thing, which more generous public support for the Fund would help to remove.

Sir HUMPHRY ROLLESTON said that whereas Churchmen remained uncontaminated by the sins they made war on, and legal luminaries were too wise to engage in litigation on their own account, members of the medical profession were liable to infection from their patients, and were, therefore, relatively short-lived. The rank and file of the profession started work with very little but hope and energy to support them, and that they often had to leave off without having made adequate provision for retirement was only too clearly shown by the cases that came for relief to the Fund. As practitioners they were bound to make an appearance of greater prosperity than the bank book would justify, and the contrast between their apparent prosperity in life and the condition of widow and children afterwards was painful. Only one-tenth of the profession in Great Britain subscribed to the Fund, and he was sorry to say that London was far from taking the lead, only 7 per cent. of the members of the profession subscribing.

The Annual Report and Financial Statement (summarized in the Chairman's remarks) were adopted, and on the motion of Dr. HERBERT SPENCER, seconded by Sir DYCE DUCKWORTH, Sir Thomas Barlow was re-elected President, Sir Charters Symonds Honorary Treasurer, Dr. Newton Pitt Honorary Secretary, and Dr. Arnold Chaplin Chairman of the Case Committee. The Vice-Presidents, Committee, and Auditors were also re-elected, and on the motion of Dr. O. LANKESTER a vote of thanks was accorded to the Press, and especially to the Editors of the *Lancet* and the *British Medical Journal*, for publicity given to the Fund during the year.

THE SPAHLINGER TREATMENT.

THE search for an infallible remedy for the treatment of tuberculosis is as alluring to-day as was ever the quest for the philosopher's stone. It has been pursued intensively for well over a hundred years and yet many would still subscribe to Laënnec's pessimistic statement that the "cure of tuberculosis is not beyond the powers of Nature, but it must be admitted at the same time that Art possesses no means of attaining this desirable end."

Every week some new preparation or nostrum is brought to the notice of the medical profession, but on trial proves to be the fairy gold of medication turning to ashes in the morning.

Men of science have been equally led astray and, like Sir Walter Raleigh, have brought vain news of an Eldorado for the victims of tuberculosis. Many of us can recall the high hopes that were raised by the announcement of Koch's tuberculin and of Marmorek's serum, hopes that at first appeared to be fully justified by the successful treatment of a few cases.

At the present time the medical profession has to consider the problem of M. Henri Spahlinger's method of treatment, and in view of the experiences of the past it is not surprising that hitherto its leaders have suspended judgement on the matter. It is equally true that many of those who have visited M. Spahlinger's laboratory have recognized in him an enthusiastic and serious worker, whose claims demanded and have obtained consideration at the hands of experts in tuberculosis either acting independently or as the advisers of the health authorities in various countries. We last referred to the matter three months ago (February 10th, 1923, p. 252), when we stated that inquiries into the nature and results of M. Spahlinger's methods had been made both by the Red Cross Society and by the Ministry of Health, and added that we had reason to believe that the methods were looked upon as interesting and the results, though hitherto on a very small scale, as encouraging.

With regard to the action of the Ministry of Health in the matter we gather that from the beginning such statements as M. Spahlinger has published in England and France have been carefully noted by the Ministry; in 1920 special medical inquiry was made and all the testimony then available was considered; this evidence included clinical reports from physicians practising at Geneva, Montana, Hamburg, and London.

In 1922, through the courtesy of M. Spahlinger, a medical officer of the Ministry was enabled to visit the Bacterio-Therapeutic Institute, Carouge, Geneva, and to examine certain cases of tuberculosis, treated by the method. The conclusions arrived at were that although it is not yet possible to express an opinion upon the scientific value of M. Spahlinger's work from the bacteriological standpoint inasmuch as the details and the technique adopted in the preparation of serum and vaccine remain undisclosed, the clinical results already obtained in Switzerland and in England warrant further investigation. We are informed that the cases examined by the medical officer included examples of lupus,

tuberculous glands, and bone and joint tuberculosis, in addition to pulmonary tuberculosis. The histories were well authenticated; in the pulmonary cases tubercle bacilli had been present in the sputum and some of these cases had been in an advanced stage and their condition regarded as hopeless prior to the initiation of M. Spahlinger's treatment. Radiological evidence also was forthcoming in a number of the cases; it showed the conditions before and after treatment by M. Spahlinger's preparation. Making every allowance for the fact that a certain proportion of patients suffering from tuberculosis get well under any conditions, the complete or partial arrest of active and extensive disease produced in these cases in a short period of time after the administration of M. Spahlinger's remedies and remaining permanent through several years' observation appears to be a striking contribution to the evidence for the efficacy of the treatment.

The Ministry, through unofficial channels, intimated to M. Spahlinger that with his consent it would be prepared to appoint a committee of recognized medical experts who would watch the results of his method of treatment in a number of cases to be selected by a physician nominated by M. Spahlinger and who after due trial would report on the value of the treatment. It was understood that M. Spahlinger would not be required to divulge the technique by which the serum and vaccine are prepared.

This offer lacked nothing on the side of generosity, but, unfortunately, M. Spahlinger did not accept it. M. Spahlinger makes a "complete" serum and a "complete" vaccine, but it would seem that in 1914 he had practically exhausted his supply of both. Since that date he has continued the preparation of partial serum in small quantity and it has been used for the treatment of a few cases. The preparation of the complete serum is stated to be a long and complicated process, and it would appear that at present M. Spahlinger can assign no definite date for the production of the serum in large quantities for general use or even for the purposes of an experimental investigation such as that proposed by the Ministry of Health. The offer made is, we understand, still open. No later than March 21st last the Minister of Health, in reply to Dr. Watts in the House of Commons, stated that he was most anxious to encourage further trial of the remedies in this country as soon as supplies were available.

We understand also that M. Spahlinger has exhausted his financial resources in the prosecution of his researches and that pecuniary embarrassments still further delay the production of his long awaited preparations. The British Red Cross Society, mindful of the interests of ex-service men, has interested itself in the matter, and we understand that some time ago it made M. Spahlinger an offer of financial assistance under certain conditions.

We have heard—a preliminary notice to this effect was indeed made some months ago—that an influential movement is on foot to issue in this country a public appeal for funds which shall relieve M. Spahlinger of his financial disabilities. We have very little doubt that should it be found possible to make a satisfactory arrangement with M. Spahlinger, sufficient money would become available in this country alone, and there is reason to believe that some of the Dominions also would be willing to make contributions.

Should the financial disabilities from which M. Spahlinger is now suffering be removed, we would urge him, not only in his own interests, but in the general interests of humanity, to submit the first supplies of the serum and vaccine when obtained to a scientific tribunal whose decision, if favourable, would rank him indisputably among the great benefactors of mankind and which would lay open a great avenue of hope to those enrolled in the company of the Captain of the Men of Death, as Bunyan phrases it.

We would emphasize our belief that the world is ripe for the discovery of a successful method for the treatment of tuberculosis. Following on the labours of Koch and others, workers of repute are engaged in attempting to solve the same problem as that to which M. Spahlinger has devoted his gifts and fortune. Already results have been achieved in the serological investigation of tuberculosis which are full of promise. M. Spahlinger must not delay to bring forward scientific proof for the considerable claims he has advanced. It may be remembered that Adams was forestalled in his mathematical discovery of the planet Neptune by Leverrier.

Victoria.

The First Australasian Congress of the British Medical Association.

The medical profession in Australia has learned with pleasure that it is the intention of the President of the parent Association to be present at the first Australasian Congress of the British Medical Association, which is to be held in Melbourne from November 11th to 17th. Sir William Macewen is assured of a hearty welcome, and it is hoped to induce him to open the new Anatomy Department in conjunction with the University Council.

An exhibition of trade products, including medical and surgical instruments, books, drugs, foods, and other articles of direct interest to the medical profession will be held in the new Anatomy Department of the University of Melbourne during the Congress. Exhibitions from Great Britain will be particularly welcome; a special feature is being made of this section of Congress activities. Intending exhibitors from Great Britain should put themselves in communication with Dr. B. L. Stanton, Children's Hospital, Pelham Street, Carlton, Melbourne, as soon as possible, and should allow a period of about twelve weeks for the dispatch and receipt of letters. Cable messages to Dr. Stanton will, of course, secure prompt attention.

The War Memorial of the Victorian Branch of the British Medical Association.

A very beautiful memorial in bronze has been executed by the sculptor, Mr. Webb Gilbert, to the order of the Victorian Branch of the British Medical Association, to commemorate those members who laid down their lives for King and country in the war. Pending the erection of a new building for the local branch of the Association, this memorial is to be placed in the new Anatomy Department. The unveiling of this beautiful masterpiece of art will be one of the special features of the Congress to be held in November; the site selected is naturally the best in the building.

The University of Melbourne.

Dr. W. A. Osborne, Professor of Physiology, has returned to Melbourne after a study leave of absence in America and Great Britain.

The number of first year medical students entering the University continues to fall; it is now little more than a third of the entries in 1919, which was the maximum year. Coincident with this decline in the numbers there has been a great advance in the efficiency of University teaching. Changes in the curriculum—namely, an examination in anatomy and physiology at the end of the second year—a slight increase in the fees, and a lengthening of the whole curriculum, have probably tended to reduce the entries but have enhanced the University's efficiency. The imposition of an examination in anatomy and physiology in both second and third years has been welcomed by both students and staff; the former recognize the newly introduced second year examination as an inducement to work and as making the work of the third year somewhat easier, and the latter are assured of an enhanced degree of efficiency all round.

Scotland.

Honorary Degree of Doctor.

At the statutory half-yearly meeting of the General Council of the University of Edinburgh, Principal Sir J. Alfred Ewing, K.B.E., presiding, the chief item of business was a discussion on the report of a subcommittee appointed to inquire into the regulations under which the degree of Doctor was granted. The council approved of the report on the following heads: (1) That every graduate should have the right to proceed to the degree of Doctor in his own faculty under appropriate regulations, including the degrees of D.D. and LL.D. (2) That a graduate with honours or distinction should be permitted to proceed to the degree of Doctor within a shorter time than the holder of an ordinary degree. (3) That the minimum time which

must elapse after graduation and before examination for the degree of Doctor should be the same in all faculties; and that a reasonable minimum for graduates with honours was two years and for ordinary graduates three years. (4) That an approximately uniform standard should be aimed at for the degree of Doctor in all faculties. Other recommendations of the committee, upon which no opinion was expressed by the Council, were that degrees of Doctor should be given *honoris causa* to persons eminent in the subject of the particular degree, as well as by examination; and that in the case of persons who merited honour from the University, but who could not claim distinction or ability to pass examination in any faculty, no degree should be given but these persons should be admitted "Honorary Fellows of the University." It was decided to ask the councils of the other Scottish universities to send representatives to a conference on this matter.

CARE OF THE FEEBLE-MINDED IN SCOTLAND.

At a meeting held last week, under the auspices of the Edinburgh Women Citizens' Association, an address on the permanent care of the feeble-minded was given by Dr. R. D. Clarkson, medical superintendent of the Royal Scottish National Institution, Larbert. Sir H. Arthur Rose, chairman of the General Board of Control for Scotland, who presided, said that this was one of the most important matters before it at the present time. Owing to the position of the national finances the Lunacy and Mental Deficiency Act of 1913, which was a statutory instrument of very great value, had been kept back from full fruition; but as soon as more freedom was given this particular work would receive the most sympathetic attention from the Treasury. Dr. Clarkson in the course of his address said that when he was appointed medical officer of the Institution for Mentally Defective Children at Larbert thirty years ago the general public took very little interest in the matter, but since then there had been a great change. Interest began in the schools, because defective children were a hindrance to their normal fellows. Social workers had also found that mental defectives played a great part in producing the problems with which they had to deal. He urged that all mental defectives should be registered, and should never be allowed to pass altogether out of control; also that farm-colonies should be established for them on the lines of one already started at Sandlebridge. At the close of the meeting the following resolution was unanimously passed: "That this meeting of Edinburgh citizens desires to express its earnest conviction that the time has come for immediate steps to be taken for the provision of homes throughout the country for the permanent care of the feeble-minded after school age." It was agreed to send a copy of this resolution to the Prime Minister, the Secretary for Scotland, the Board of Control, and the local members of Parliament.

Ireland.

WOMEN'S NATIONAL HEALTH ASSOCIATION.

THE annual meeting of the Women's National Health Association of Ireland was held at Ely House, Dublin. The Marchioness of Aberdeen and Temair presided, and said that it was intended to hold a conference during the coming autumn to which representatives of public bodies and voluntary associations interested in public health would be invited. The condition of the country, she said, had made it somewhat difficult to carry on the work of their branches, but good reports had been received from outlying districts. She submitted reports from Valentia Island, Waterford, Cork, Limerick, and Clare, all of which spoke of good welfare work being done.

Dr. Alice Barry submitted a report on the working of baby clubs and welfare societies in the city of Dublin. The mortality rate during the last year amongst children was 116 per 1,000, as compared with 163 per 1,000 a few years ago. Through the babies' clubs they had distributed 12,666 gallons of milk at an average price of 5d. a quart. The following resolutions were unanimously adopted:

(1) That the Council of the Women's National Health Association, feeling that there is urgent need for co-operation between the different bodies giving relief in the city of Dublin and in Ireland generally, request the Civics Institute to call a conference representing the different organizations, official and voluntary, interested in the subject, to discuss plans and form schemes whereby such work could be placed on a more satisfactory basis.

(2) That the Council approve of the principles and basis of the Children's Charter and direct the Sub-Executive Committee to examine its provisions with a view to adapting them to the needs of the children of Ireland, and to draw then the attention of the Free State Government to the Children's Charter with the request that it be adopted as the Government's policy regarding the position and claims of the children.

ST. ULTAN'S INFANT HOSPITAL, DUBLIN.

The foundation stone of a bacteriological laboratory, presented to St. Ultan's Infant Hospital, Charlemont Street, Dublin, by the Celtic Cross Society of Chicago, was laid last July by Mrs. MacWhorter, president of the society. The building, which is up to date in every particular and fitted with the most modern appliances, is now complete and was formally opened a short time ago. Miss Griffin, chairman of the Hospital Board, called upon Dr. W. M. Crofton to perform the opening ceremony and presented him with a golden key. One of the earliest patients admitted to the hospital, a sturdy lady of three years, presented Mrs. Crofton with a bouquet. Dr. Crofton made a short speech. Sir Edward Coey Bigger also spoke. Subsequently those present were entertained to tea by the board. In the evening of the same day a Pasteur celebration was held in the College of Physicians, when the president, Dr. M. F. Cox, was in the chair. Dr. Crofton gave a very interesting address on Pasteur, his life and work, and on some modern followers of his teaching. A vote of thanks to the lecturers was proposed by Dr. Ella Webb, chairman of the St. Ultan's Medical Board, and seconded by Dr. Kathleen Lynn, vice-chairman. The company were then entertained to tea, during which a short programme of music was gone through.

England and Wales.

THE *X*-RAY DEPARTMENT OF THE MANCHESTER ROYAL INFIRMARY.

THE new *x*-ray department of the Manchester Royal Infirmary, formally opened by Sir Humphry Rolleston last November during the joint meeting of the Röntgen Society and the Electro-therapeutic Section of the Royal Society of Medicine in Manchester, is now an important part of the hospital as an institution for the treatment of patients and the teaching of students.

When the Infirmary was opened in 1908 the accommodation provided for *x*-ray work was in the basement premises. The new department is now housed on the ground floor and there is sufficient space to allow each section of *x*-ray work to be conducted in its particular room. The money for the equipment was found by the generosity of a private donor. The protection of the walls—a matter of considerable importance—has been obtained by using commercial barium sulphate mixed with cement; it has been found quite satisfactory and very much cheaper than sheet lead. At present there is a surgical waiting list of about 1,000 patients, a large proportion of whom pass through the *x*-ray department before operation. In view of this high figure freedom from breakdown is essential, and Coolidge tubes working from transformers were installed as giving the highest reliability of output. The demonstration room is one of the features of the department. It is the teaching section and is provided with a lantern and viewing boxes and is used to demonstrate cases that have been previously examined in the screening room. In the screening room is a couch that can be tilted and is of assistance when palpating coils of intestine. A useful accessory is a Pirie retinometer, a device with three luminous points, the smallest of which should be visible before beginning to screen a patient.

In the deep therapy department is one of the German outfits, and an English-made apparatus of the oil-immersed type. In the dark room the new Thorne-Baker green glass

has been fitted, which gives a plentiful slightly green light, which is apparently safe though it looks dangerous. It is a pleasanter light and has replaced the red lights previously in use.

A medical officer's room is provided where other members of the hospital staff may discuss their cases with the radiological staff. An office with a comprehensive filing and indexing system and plate-viewing room are other features of the department, and there is a workshop, fully equipped with tools for both wood and metal work, where minor repairs can be made. All the *x*-ray work is to be done on films, and an apparatus for making reduced prints (from wet negatives if necessary) is being fitted. All the cables for the department pass through two large switch boards and the connexions can be altered as required to balance the load equally between the two stations from which the department obtains its power. The work of installing the apparatus was entrusted to Messrs. Watson and Sons of London, and the new department may be regarded as a model of a modern *x*-ray equipment arranged to serve a large general hospital with an extensive out-patient practice. The department is probably the finest in the country and reflects the greatest credit on all those concerned in its establishment and equipment.

NEW MATERNITY HOSPITAL, LIVERPOOL.

An appeal for £100,000 was launched at a representative meeting at the Town Hall, Liverpool, on March 25th. The late Sir William Hartley gave £25,000, and had not the great war intervened the hospital would have been completed by this time. The present maternity hospital is utterly inadequate for the accommodation of patients and to meet the requirements of medical students. It originated in 1796 as a ladies' charity to provide attendance upon lying-in women in their own homes. In 1841 the Liverpool Lying-in Hospital was established, and in 1869 these two establishments were amalgamated. Under the Emeritus Professor of Obstetrics—Dr. Henry Briggs—during the past thirty-eight years the conjoint charity was developed to the great advantage of the medical students, whose practical training in midwifery was placed on a sound basis. Ante-natal care will become a department of midwifery and will be kept in view along with the post-natal treatment of the child. Infantile mortality has shown a great decrease in the last twenty years, but the mortality of parturients has remained the same. It is anticipated that a well equipped and properly staffed maternity hospital worthy of the city will reduce the maternal mortality. The number of lying-in women treated was 205 in 1894 and 1,200 in 1921. In addition to Sir William Hartley's donation, £7,000 have already been promised.

Correspondence.

THE "UNIT" OF INSULIN.

SIR,—Dr. Cammidge, in your issue of May 5th (p. 787), expresses the opinion that "it is unfortunate that the Medical Research Council have seen fit to adopt a unit of measurement for insulin differing from that originally described by its inventors." Dr. Cammidge has not informed himself adequately, and his statement may contribute to that confusion, the possibility of which he rightly deplores. The unit has been changed, but not by the Medical Research Council; the change was made by the Toronto Committee and the American firm working under their immediate authority. American insulin was to appear on the British market coincidently with the first public offer of the home-made product, and uniformity could only be obtained by adopting the new unit, now current in all parts of the American continent. There is a minor inconvenience entailed, for those who had already in use a privately made supply, tested on the old basis. They have to bear in mind the fact that approximately three units of the current commercial product should correspond to one unit of what they had tested by the original Toronto indications. But Dr. Cammidge will, I think, agree that this is a small consideration compared with that of the necessity for a world-wide uniformity of measurement, now and for the future.—I am, etc.,

H. H. DALE.

Department of Biological Standards, Medical Research Council, May 7th.

THE EXAMINATION OF COLLOIDAL SOLUTIONS.

SIR,—Professor Clark, in his recent note (BRITISH MEDICAL JOURNAL, 1923, p. 731), is decidedly uncritical. He remarks that the collosol ferrum Crookes which he has examined is very feebly acid in reaction, although mine was very faintly alkaline; at this point he ceases experiment and does not proceed to make his solutions feebly alkaline and then note whether the iron is precipitated. The iron is not thrown out of solution when the solution is made distinctly alkaline; this is one of the indications that it is in the colloidal state, and involves a simple test which he might readily have made. The addition of a minute amount of sodium hydroxide, sufficient to convert an N/300 acid solution to an N/300 alkaline solution, is required for the reversal of the reaction. My conclusion thus stands that collosol ferrum Crookes is a preparation of a colloidal iron compound of the sugar type described by Graham in 1861.

Let me offer another simple demonstration of the colloidal state of the iron in the solution under discussion. The components capable of forming colloidal particles are the gelatin and the iron; the gelatin is present in the proportion of about 0.5 per cent. A gelatin solution of this concentration, examined in the ultra-microscope, shows a low concentration of very sluggishly moving particles; it shows a faint Tyndall effect—that is to say, a beam of light thrown through the solution appears as a but faintly illuminated track. On diluting the 0.5 per cent. gelatin fifty times, proportionately fewer but still sluggish particles are observed in the ultra-microscope, and the Tyndall effect is almost absent. The influence of the gelatin, as concerns the Tyndall effect—and this may be observed by anyone—and the ultra-microscopic appearances can thus be evaluated; the only other colloidal factor involved is the iron. Collosol ferrum is so densely packed with colloidal particles as to be almost opaque to the beam of light which produces the Tyndall effect or is used in the ultra-microscope; but on diluting it fifty times a solution is obtained which shows the Tyndall effect very strongly, and gives in the ultra-microscope field a dense assemblage of colloidal particles in intense Brownian agitation. This result, the minute effect of the gelatin having been observed and allowed for, leaves it beyond doubt that iron in the colloidal state is responsible for the appearances noted.

It should be remarked that collosol ferrum is a negative colloid—that is, the colloidal particles are negatively charged—whilst the colloidal iron solutions obtained by dialysis of ferric solutions or by prolonged boiling of ferric acetate solutions are positive colloids. The two types of colloids show very different properties, and, when mixed, mutually precipitate each other; thus, on mixing collosol ferrum with a dilute solution of dialysed iron, practically the whole of the iron in both solutions is thrown out as a gelatinous precipitate. This is a further striking demonstration that the iron in collosol ferrum is colloidal.

Although collosol ferrum gives no colour directly with ammonium sulphocyanide, it gives the characteristic red colour with this reagent after addition of sulphuric acid; the colloidal ferric iron thus does not react with the sulphocyanide until it is actually dissolved in the sulphuric acid.

Professor Clark, whilst flying in the teeth of providence by his inadequate methods of showing that many well known colloidal solutions are not colloidal, expresses indignation at my statement that many, if not most, of the experimental results recorded in his earlier paper (BRITISH MEDICAL JOURNAL, 1923, i, p. 273) are erroneous and misleading; he complains that I produce no evidence to show that a single experimental fact stated in his paper is incorrect. I will rectify the omission, if one it be. He has told us that he finds a total of free and combined iodine in collosol iodine aqueous (Crookes) of 0.04 per cent., and is supported in this by the analyst selected by the BRITISH MEDICAL JOURNAL. My analyses show that the solution contains almost exactly five times this percentage of iodine;

methods of work which lead to four-fifths of the iodine present being lost in an analysis provoke unkind remarks. But I do not agree that I have publicly ridiculed Professor Clark; I have merely shown that he has been led, by a too superficial study, to cast unfounded aspersions upon the characters of a number of thoroughly reputable colloids.

I add to the proof a note on Professor Sir William Bayliss's remark (BRITISH MEDICAL JOURNAL, 1923, p. 786) that collosol ferrum, diluted one hundred and thirty times, should appear to be crowded with colloidal particles; this is the case, both with the acid and the alkaline solution. Comparative observations made on 0.5 per cent. gelatin and collosol solution, each diluted one hundred and thirty times, indicate that these colloidal particles can only consist of a colloidal iron compound.

Dr. Dale's delicious sally will bear rereading when it is agreed that intelligent experiment proves what presumptuous experiment has denied—namely, that collosol ferrum contains an iron colloid. *Olim meminisse juvabit.*—I am, etc.,

Cambridge, May 3rd. WILLIAM J. POPE.

We have referred this letter to Professor Clark, who writes:

SIR,—Sir William Pope in his first letter stated that collosol ferrum must be a colloidal preparation because it was alkaline and the iron was in the ferric state. This was an unfortunate argument because in the first place collosol ferrum is acid in reaction and the bulk of the iron is in the ferrous condition, and in the second place it is perfectly easy to make a dilute mixture of non-colloidal iron and gelatin which will give all the reactions for ferric salts, but which is not precipitated by moderately strong alkali. Sir William Pope's facts were wrong, and even if they had been right his argument was worthless.

I did most of the experiments described in Sir William Pope's last letter more than a year ago; it was Sir William Pope who stressed the importance of the reaction of collosol ferrum; I knew that the point was of no value as regards proving the colloidal or non-colloidal character of collosol ferrum; on the other hand, I thought the point of great value as a simple test of the care and accuracy with which Sir William Pope had prepared the strange attack he directed against me.

He says that the sample which he tested was alkaline, but it is certain that the vast majority, if not all the samples of collosol ferrum on sale are acid in reaction, and if Sir William Pope had taken the trouble to test a proper range of samples he would have saved himself from making a rather ridiculous mistake by basing sweeping conclusions on an atypical sample. As it is, his first letter consists of a rather unpleasant mixture of violent criticism and elementary mistakes. The facts stated in his second letter I believe to be correct, but some of the deductions are absurd.

I have dealt with the deductions regarding the reaction of the fluid. As regards ultra-microscopic examination, collosol ferrum is a turbid viscid fluid which usually deposits a considerable precipitate; naturally it is crowded with ultra-microscopic particles, but evidence is needed that these particles are composed of iron. Moreover, I am not prepared to say that no trace of colloidal iron is present; what I have said is that any fraction of the iron which may be in colloidal form is too small to be demonstrated by the usual tests of dialysis and ultra-filtration. As Sir William Pope states, it is quite true that collosol ferrum precipitates dialysed iron, but he has previously stated that the collosol contains 0.5 per cent. of gelatin, and he must surely know that gelatin precipitates dialysed iron, and that therefore this test is no proof that the collosol contains colloidal iron.

Sir William Pope finally turns to discuss my work on collosol iodine. I found that this substance contained one-quarter of the advertised amount of iodine, and was so surprised that I got the British Medical Association to have an independent analysis performed. This was done by Mr. Tickle, County Analyst for Devonshire, and his results agreed exactly with my analysis. While this work was proceeding, Messrs. Crookes apparently revised their ideas concerning the iodine content of collosol iodine, for while the label on the bottle still stated that it was an 0.2 per cent. solution, they stated in their literature that it contained 0.05 per cent. of colloidal iodine. Nearly three months after the publication of my paper Sir William Pope discovers that now this preparation contains 0.2 per cent. of iodine free and combined, and takes this as evidence that both I and an experienced analyst had independently made an identical series of gross errors in an extremely simple piece of chemical analysis. The analyses given in my paper stated correctly the composition of collosol iodine at the date when they were performed. I do not suggest that Sir William Pope's recent analysis is incorrect, but obviously it does not prove that the previous results were incorrect.

I am unwilling to take up space in the BRITISH MEDICAL JOURNAL with a personal matter, but I feel it is in the public interest to protest against the tone which Sir William Pope has seen fit to adopt in this controversy. At the request of the British Medical Association I examined certain commercial preparations, and some of the facts observed did not agree with the claims advertised.

Sir William Pope, for reasons unstated, has taken violent exception to my daring to criticize these commercial preparations, and has attacked my work with a violence that is unusual in scientific literature. Fortunately for me, the inaccuracy of his facts rendered Sir William Pope's attack ineffective.

Sir William Pope has stated that many if not most of my experimental results are erroneous, and that my methods are uncritical and inadequate. I do not claim infallibility, but Sir William Pope has not yet shown that a single one of my experimental results is incorrect.

Surely Sir William Pope must realize that sweeping charges like the above must be either fully substantiated or withdrawn.—I am, etc.,

London, W.C., May 8th. A. J. CLARK.

CATGUT OR SILVER?

SIR,—With reference to your report of the proceedings of the British Congress of Obstetrics and Gynaecology held in Edinburgh, I beg to be allowed to amplify and so make clear the allusion to the "lively interchange of views on the best suture material for use in cases of vesico-vaginal fistulae" between Dr. Herbert Spencer and myself. I am sure no one more than Dr. Spencer would regret a misunderstanding in the matter.

I stood up for the use of catgut in surgery generally, as well as for vesico-vaginal fistulae in particular, as opposed to the sole use of silk, and in the case of vesico-vaginal fistulae of silver wire, advocated by Dr. Spencer. I confessed, as any honest gynaecologist must, that occasionally I had failed to close a high vesico-cervical or vesico-vaginal fistula at the first attempt—sometimes after others had tried—although I had succeeded at the second or, in one or two cases, at the third attempt, and that when I had failed I blamed myself and not the suture material. Dr. Spencer retaliated by saying that he had never failed to cure any case with silver wire; and the impression left on the Congress was that he had cured every case at the first attempt. This, indeed, is what your report—a perfectly accurate one—would lead anyone to suppose. Yet, although it appears that there would be no point in Dr. Spencer's statement unless he had meant this, I do not believe it possible that he intended to convey such an impression. I call attention to this misapprehension not to discredit Dr. Spencer in any way, but to prevent a false idea gaining acceptance through a misunderstanding of what Dr. Spencer meant when he said he had never failed to cure a case (that is, in the end)—namely, that silver wire may be looked upon as a corrective for imperfect technique in these difficult cases.—I am, etc.,

Liverpool, May 5th. W. BLAIR BELL.

THE INFLUENCE OF INTESTINAL BACTERIA UPON THE THYROID GLAND.

SIR,—I make no claim to be the first to suggest that the intestinal bacteria interfere with the supply of amino-acids to the tissues, including the ductless glands. This was pointed out as early as 1905. Mr. Slesinger (April 14th, 1923, p. 659) in 1913 mentioned tryptophane as a possible precursor, not of thyroxin, as his letter seems to suggest, but of "the pigment in Addison's disease"; further comment is unnecessary, except to mention that the thyroid gland,

much less its active principle, was not even mentioned in his article. In an article, which I have ready for publication, I hope to throw some doubt on the supposition that tyrosin is the precursor of adrenaline.

Professor Kocher pointed out the dangers of giving iodine internally in quiescent goitre; I get good results with kerol, and I never give iodine now.

In conclusion I should like to remind optimistic surgeons that they have not yet convinced many eminent physicians (and a few surgeons) of the striking results of operative treatment of exophthalmic goitre.—I am, etc.,

Cardiff, May 2nd. D. J. HARRIES.

SEPTICAEMIC INFECTION FOLLOWING OPERATIONS FOR APPENDICITIS.

SIR,—Mr. Herbert H. Brown in the BRITISH MEDICAL JOURNAL of April 7th, 1923, gives very interesting and instructive details of several cases of fatal septicaemia which have followed operations for acute appendicitis during the latter half of the first week, following acute clinical symptoms. I await with considerable interest further evidence of the value of the prophylactic serum of *B. coli* and *Streptococcus faecalis* he has had prepared.

As is pointed out in his article, the importance of the condition depends on the presence or absence of an effective bacterial immunity or resistance, and, as it is impossible to guess at the existence or absence of such, I would venture to suggest that considerable help may be obtained from a simple blood count estimation for evidence of an effective leucocytosis.

I have been in the habit of accepting such findings as indicating that prophylactic stimulation of further antibody response will probably be obtained from vaccine inoculation, particularly of the detoxicated variety, which doses may be repeated at twenty-four hour intervals. On the other hand, a low total count as regards white cells, or an actual leucopenia associated with an absence of relative increase of eosinophiles, I have considered contraindicates vaccine therapy in an acute case, but it suggests that help from serum therapy is possible.

The brunt of acute appendicular infectiveness, apart from lymphatic infection, must necessarily fall upon the portal system, which carries a large volume of infected blood by means of the portal vein to the liver. It is of special interest to note that Griffiths[1] very clearly points out the importance of such portal infection, as a cause not only of hepatitis, but also of pancreatitis. The type of cases that Mr. Brown so clearly cites seem to suggest this process.

I have for some time, in a somewhat empirical manner, suggested that vaccine or serum therapy in cases of acute abdominal infection should be reinforced by the administration of both bile and pancreatic extract, thereby enhancing the digestive metabolism of two most important organs, whose functional efficiency in an acute abdominal infection must frequently be very gravely embarrassed. So definite has been the result in several rather similar cases to those which Mr. Brown details, that I have ventured to write these points in case they may be of interest to others when confronted with this condition.—I am, etc.,

E. CRONIN LOWE, M.B.E., M.B., B.S.

Liverpool, April 13th.

STERILIZATION OF THE UNFIT.

SIR,—Dr. R. A. Gibbons believes that legislation for (1) eugenical sterilization and (2) marriage by State health certificate is "to be hoped for." There are good reasons why such legislation should not be hoped for. It is unlikely to come about, and it is undesirable that it should come about. The American mania for social legislation which so attracts Dr. Gibbons may better serve as a warning than as an example. It is strange, moreover, to find a member of the medical profession asking to have his present freedom controlled by the caprices of ignorant lay opinion.

Dr. Gibbons is ill informed concerning the evidence he brings forward. The Indiana law which he quotes at length became a dead letter in 1909, two years after it was passed, and was finally declared "unconstitutional" in 1921; so also that of New Jersey. There never seems to have been any such law in Utah. That of New York was repealed in 1920, and quite time; "the history of this law," we are told, "is a record of incompetency and discredit; it has set back eugenical progress in the State's institutions more than ten years." But Kansas has sought to make up, for here a law was passed which would enable Dr. Gibbons not only to operate by law, but also to be fined one thousand dollars if he operated otherwise than by law, and, further, to be sent to prison for thirty days should he fail, or neglect, or refuse, to operate. This is the logical result of sterilization by law. Should Dr. Gibbons desire to emigrate to Kansas he will find further particulars in the latest and most authoritative work on this subject, Dr. Laughlin's *Eugenical Sterilization in the United States*, published last December by the Psychopathic Laboratory of the Municipal Court of Chicago, whence it may probably be obtained by qualified applicants.

In his thirst for sterilization laws Dr. Gibbons fails to make clear that they are quite unnecessary. There is nothing to-day to impede the spread of eugenical sterilization among us—with, of course, the consent of all responsible persons concerned—as introduced more than fifteen years ago in Switzerland. One would like to know why Dr. Gibbons, who has so much to say about the United States, fails to refer to the highly relevant fact that in the State of New York it has for more than ten years been the practice at the Buffalo State Hospital for Women to sterilize for eugenical reasons, with the written consent of the relations, but without reference to any law. That is the line of sound progress.

With regard to marriage by health certificate, and compulsory celibacy, while there is good reason for opposing procreation by unsuitable persons, there is no social reason for opposing marriage, but rather the reverse. In the early world marriage and procreation may have been the same thing; they have long ceased to be the same thing in the world in which Dr. Gibbons lives. In muddling them up Dr. Gibbons commits an unfortunate confusion, for not only is his anti-marriage propaganda bound to fail, but in the mere act of preaching it he is bringing ridicule and discredit upon the eugenical control of procreation.

There are in his paper various other misleading statements which may now be passed over. But in preparing the way for a measure so excellent as eugenical sterilization, and so certain to be eventually recognized in general medical and surgical practice, it is desirable to be cautious, accurate, and precise, leaving to opponents of the measure a total monopoly in arguments and statements that are otherwise.—I am, etc.,

London, S.W., May 7th. H. HAVELOCK ELLIS.

HOSPITAL POLICY.

SIR,—Dr. Bernard Batt suggests that the policy of the Association regarding staff funds should be limited to patients on whose behalf there had been arranged some form of obligation through contributory schemes or payments by third parties; and that the Leicester resolution, or any modification of it, requiring an assessment of patients' own payments for staff funds, should be dropped. This proposition would, I think, prove unworkable, because it is an attempt to distinguish between patients who are not properly distinguishable. We are up against a similar difficulty in London. The Metropolitan Counties Branch Council, through a special committee, has been negotiating with the Hospitals Saving Association, for the improvement of the contributory scheme launched by it. By general consent the conditions of admission for out-patient treatment had been made the crucial point. We desire to bring these admissions within the policy of the Association, so that they should be mainly for consultative purposes. The sponsors of the scheme cannot accept this limitation of out-patient admissions. The secretary writes: "My chairman feels strongly that contributors cannot, and should not, be excluded from the out-patient facilities which are offered to non-contributors." As with this reform, so with staff funds—it must be assessment for all payments or for none.

On the point of Dr. Batt's challenge that the Council has not carried out the instruction of the Representative Body by securing information, I suggest that the report of the

[1] *Lancet*, February 10th.

Council is a fair statement of the facts governing its doings, and that the Representative Body will judge of its deeds whether they be good or evil.—I am, etc.,

London, W., May 3rd. N. BISHOP HARMAN.

*** This correspondence cannot profitably be continued.

NOTIFICATION OF CONVICTIONS OF MEDICAL PRACTITIONERS TO THE GENERAL MEDICAL COUNCIL.

SIR,—Under this heading in the Report of Council (SUPPLEMENT to the BRITISH MEDICAL JOURNAL, April 28th, p. 141) there appears such an absolute travesty of my letter of July 1st, 1922, on this subject, that I ask, in fairness to myself, to be allowed to restate my case.

I am of opinion that convictions for trivial offences are not under the jurisdiction of Section 29 of the Medical Act of 1858. My legal adviser thinks with me. So, apparently, does the Registrar of the General Medical Council. I asked him if cases of breach of promise and bankruptcy were reported to the General Medical Council. This is his answer:

April 7th, 1922.

DEAR SIR,—In reply to your letter of the 6th inst., I have to say that Section 29 of the Medical Act of 1858 directs the Council to deal with two classes of offences—namely, convictions for felony or misdemeanour, or infamous conduct in a professional respect. Cases such as you mention would not as a rule come within either of these categories.—Yours faithfully,

(Signed) NORMAN C. KING.

I am left wondering by what process of legal reasoning failure to renew my dog licence (with conviction therefor) can be brought "within either of these categories." This despite the fact that Dr. Macdonald's mind seems to be satisfied on the point. (See SUPPLEMENT, May 5th, p. 169.)

"As a means of dealing adequately with real offenders" I suggested that real offences should be reported to the General Medical Council. Convictions for indictable offences by (1) prison governors in cases of commitment to prison, (2) metropolitan police where fine is imposed, and (3) chief constables in the country.

I suggested a different procedure in the matter of convictions in courts of summary jurisdiction before magistrates without jury. We have to convict in many instances where there is a small or technical offence. So I suggested that magistrates (who hear the whole evidence) should do the "sorting" for the General Medical Council. Real offenders would be reported to the Council by magistrates through their clerk. A system which necessitates that a doctor's conviction for having his chimney fired by his cook should be reported by the police and be "duly recorded" in London is an indignity to which no other profession is subjected, is a futility, entails a waste of stationery and official time, and is a trespass upon a medical man's civil liberty. "Hardship" is too dignified a term to be used in connexion with a procedure which is intrinsically paltry. I claim that these are not theoretical but plain and practical objections. And in the SUPPLEMENT of May 5th quoted above I am pleased to find an ally on the Council in Sir Jenner Verrall. He seems to deprecate the reporting of "convictions of practitioners even for the most trivial and technical offences," but fathers the blame upon the Home Office. I have listened, during the last nine years, to many cases of disputed paternity and I was careful to obtain exact evidence. The General Medical Council is the admitted author of the procedure.—I am, etc.,

Stockport, May 6th. J. M. BRENNAN.

THE COOLIDGE *X*-RAY TUBE.

SIR,—The remarks of Dr. W. M. Robson on the subject of Coolidge *x*-ray tubes in your issue of April 21st (p. 699) are of great interest to us as distributors of the tubes in this country.

We feel that his unfortunate experience must be somewhat isolated as many thousands of Coolidge *x*-ray tubes are in daily use, the majority of which, to judge by the very small number of complaints we receive, are in the hands of satisfied users. The manufacture of the Coolidge tube is admittedly a difficult process demanding the most meticulous care and supervision, and it is only by exercising systematic control and testing at every stage in the manufacture that a tube is obtained as nearly perfect as it is humanly possible to make it.

Dr. Robson pays what is, to our mind, a wonderful tribute to the Coolidge tube when he states that he has known Coolidge tubes which will run "for one and a half to two hours or longer at a parallel spark-gap of 10 in. and with a current of 10 milliampères passing through the tube, without causing any trouble or anxiety." No Coolidge tube has yet been placed on the market which has been designed to work under conditions as severe as these, and the fact that he has found tubes which could be overrun to this extent without immediate damage is very gratifying evidence of the large factor of safety which we are glad to feel is commonly associated with the Coolidge tube.—I am, etc.,

GEOFFREY PEARCE,
Managing Director, Watson and Sons (Electro-Medical), Limited.

London, W.C., April 27th.

"QUAIN'S ANATOMY."

SIR,—I have had such a curious experience in connexion with the purchase of a copy of *Quain's Anatomy* that I think it would be well to communicate it to the readers of the JOURNAL. It is about three years since a lady, who wished to present a friend of hers with a good work on anatomy, asked me to recommend some particularly good work. I said that I was brought up on *Gray's Anatomy* myself, but that *Quain's* was generally considered the foremost work on anatomy in the English language. So she ordered a *Quain* from the bookman here in Clifton. It was duly delivered and paid for. Some considerable time afterwards she learnt that the edition was not complete. She went to the bookseller—he said he was sorry, but did not know it was incomplete. I then stated the circumstances to the publishers, and they were unable to give me any information as to when the missing volume of the book would be ready, disclaiming all responsibility for the delay, which was apparently due to the author of the missing volume not having the material ready for publication and issue along with the other volumes. Then I wrote to the principal editor, and he expressed regret that he didn't know when the new volume would be ready, but that "doubtless when it did appear I would be able to get a copy." Of course the recipient of the gift has had to get along by using another work treating of the blood vessels. But to me it seems a most extraordinary business transaction, and has certainly proved to be a very unsatisfactory one.—I am, etc.,

J. SMYTH, M.D.,
Colonel I.M.S. (ret.).

Clifton, Bristol, April 17th.

Universities and Colleges.

UNIVERSITY OF OXFORD.

Degree Days.— Degree days in the present term are Saturday, May 26th, Thursday, June 21st, Thursday, June 28th, Saturday, July 7th.

Rolleston Memorial Prize.—The next award of the Rolleston Memorial Prize will be made in Trinity Term, 1924. The prize is now of the value of about £100, and is awarded for original research in any subject in animal and vegetable morphology; physiology and pathology; and anthropology. Candidates must forward their Memoirs to the Registrar of the University of Oxford before March 31st, 1924. The memoirs may be printed, type-written, or in manuscript; should be inscribed "Rolleston Memorial Essay," and should bear the name and address of the author. No candidate will be eligible (1) who has not either passed the examinations for the B.A. degree or the B.M. degree at Oxford, or for the B.A. degree or the M.B. degree at Cambridge, or been admitted as a candidate for the degree of B.Sc. at Oxford, or as an advanced student for the degree of B.A. at Cambridge; (2) who has exceeded a period of six years from attaining one or other of these qualifications, or from his attaining the first of such qualifications, if he attained more than one; (3) who has exceeded ten years from his matriculation. (Reference *Oxford University Gazette*, April 26th, 1923.)

At a congregation held on May 3rd the following degrees were conferred:

D.M.—E. H. Culver (in absence).
B.M.—B. W. Williams.

UNIVERSITY OF CAMBRIDGE.

Course in Psychological Medicine.

A SHORT course for the diploma in Psychological Medicine has been planned to be held in Cambridge from July 10th to August 17th. The subjects covered will be the physiology and anatomy of the nervous system, psychology, psychopathology, mental deficiency and practical psychiatry. The fee for the full course will be twelve guineas, but attendance at separate lectures can be arranged. Applications to attend the course should be sent to the Secretary, D.P.M. Committee, Psychological Laboratory, Cambridge, before June 7th. If a sufficient number do not apply the course will not be held.

At a congregation held on May 5th the following degrees were conferred:

M.D.—T. J. H. Hoskin.
M.B.—A. G. F. McArthur, H. R. Bickerton.
M.B., B.CH.—C. B. S. Fuller.

UNIVERSITY OF LONDON.

PRESENTATION DAY.

Capping Ceremony.

THE ceremony of presenting new graduates for degrees was held on May 3rd in the Albert Hall, which was well filled. Before the presentation the Principal Officer, Sir Cooper Perry, read his report on the work of the University during the year 1922-23. The total number of graduates admitted was 8,498, as compared with 3,852 in the last year before the war, and 7,092 in 1921 and 1922. Of those admitted last year 6,746 came in through the ordinary matriculation examination, for which, it would appear, there were nearly 20,000 candidates. The number of degrees and diplomas granted was 2,422, as compared with 1,301 nine years ago, and 2,093 last year. Reference was made to the Rockefeller gifts to University College and University College Hospital Medical School, and to the approaching visit of the King and Queen to lay the foundation stones of the obstetric hospital and nurses' home, and to open the new building for anatomy, embryology and histology. Reference was also made to the other gift of the Rockefeller Trustees, which made possible the erection of buildings for a school of hygiene.

After the capping by the Vice-Chancellor, who, owing to the large number of new graduates, was assisted by two other members of the Senate, the Vice-Chancellor read his "charge," which he described as a word of counsel from an older graduate to his younger comrades. A university degree, he said, was at once an end and a beginning; the end of three or four years of study and intellectual discipline, and the beginning of a larger discipline through contact with a larger world.

Service at Westminster Abbey.

The annual service for members of the University held at Westminster Abbey was attended by a large number of graduates of both sexes wearing academic robes. The Dean of Westminster read the lessons, and the Dean of St. Paul's preached the sermon, from the words "There is nothing new under the sun," and "I will make all things new." In the course of his sermon he said that a well ordered state must have regard for proportion between social service and the remuneration for such service, with perhaps a reasonable limit to the extent to which any man might appropriate to himself the results of the labours of others. It would be necessary to get rid of the conception of "a gentleman" as a man who did no work and had plenty of money to throw away. If the country was to recover we must all do more work than we fancied we were paid for doing.

Graduation Dinner.

A graduation dinner was held in the evening at Grocers' Hall, when the Vice-Chancellor was in the chair. The toast of the University of London and the new graduates was proposed by Sir Robert Blair, Education Officer to the London County Council. The University, he said, had been a pioneer in research and the extension of knowledge and the first to open its doors to women. Its fees, however, were higher than those of Scottish, Irish and Welsh Universities. If the cost of university education in England was kept too high it would be impossible for the poor man, the small tradesman, and particularly the artisan, to send his children to the universities. In the London area there was a great mass of unorganized knowledge ready to be organized and classified, and if there was still closer co-operation with the local education authorities the destiny of the University would reach a far higher point than anybody now could imagine.

The Vice-Chancellor, in reply, referred to the suggested division of the University into two, or, as some logically minded critics had suggested, into twelve or more universities, and said that it was the opinion of the University itself, as it had been of successive Royal Commissions, that there should be one University only in London. He mentioned the great assistance the City of London had given to the establishment of degrees in commerce as a good omen, encouraging the belief that the City would associate itself more closely with the work of the University. London had always been a poor man's University, the fees of the different colleges varied, but they represented only a small proportion of the cost of the education provided. The County Council and some of the City Companies offered scholarships, but there was room for more not only to enable poor students to enter the University but also to enable worthy students to remain after graduation for post-graduate and research work. Passing to the discussions which have occurred about the new site for the University, Mr. Waring said that there was only one site within the realm of practical politics, a site of about eleven acres in Bloomsbury offered by the Government subject to certain conditions on both sides. The terms of the removal of King's College from its valuable site in the Strand would be a matter of negotiation between the Government, the Council of King's College, and the Senate of the University. Both the University and King's College would retain their present sites until the new buildings were ready for occupation free from debt; probably about six acres would be allotted for the University buildings and about four for the new building of King's College; plans for both had been prepared and were under consideration. In addition to the two great Colleges, University and King's, there were incorporated in the University 34 schools or colleges, including the medical schools. The number of students in all the institutions was estimated at about 20,000, of whom about 8,880 were sitting for degrees in the University. The teachers numbered over 1,000. Although the great bulk of the university students were preparing for the first degree London was gradually being recognized as pre-eminently the centre for post-graduate research, and for higher studies. The establishment soon after the war of the degree of Ph.D. in order to encourage post-graduate work and meet the needs of students coming from overseas, had fully justified itself; over 400 students had registered themselves for the degree. Sir William Collins, in proposing the toast of the guests, said that the University of London was not merely imperial but international. It had recognized students, the majority of them he believed Americans, from foreign universities, some of whom had received its highest degrees. In conclusion he expressed the pleasure with which the graduates welcomed the French Ambassador and representatives of the French universities. The toast was acknowledged by Viscount Burnham.

The Vice-Chancellor said that he had received a message of good wishes from the Chancellor, who was unable to be present owing to the state of his health.

ELECTIONS TO THE SENATE.

Dr. R. A. Young has been elected a member of the Senate by Convocation in the Faculty of Medicine and Sir Sydney Russell-Wells, M.D., M.P., is one of those elected in the Faculty of Science. Lord Dawson of Penn and Dr. R. L. Eason, C.B., represent the Faculty of Medicine, and Sir William Collins, M.D., the London County Council. Mr. G. Leslie Eastes desires to thank those members of Convocation who recorded their votes for him and adds that only 30 per cent. of the electorate voted.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AT a meeting of the Council, on April 12th, diplomas of membership were granted to the following:—

B. Bourke, *Emmie D. Fenwick, *Marjorie A. Godfrey, *N. R. Mucadam.

*Under the Medical Act, 1875.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.

AT a meeting of the Royal College of Physicians of Edinburgh on May 1st, when Sir Robert Philip, President, was in the chair, Dr. Henry George Masson was elected to the Fellowship of the College; and Drs. James Davie Gilruth and William Arnott Dickson were admitted to membership. The College re-elected Dr. William Russell as its representative in the General Medical Council for a further period of five years. The Freeland Barbour Fellowship for original research was awarded to Dr. James Walker Dawson. The gift by Lord Polwarth of an autograph letter by Edward Jenner dated 14th September, 1799, was received.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

J. V. DHURANDHAR, M.B., B.S.(Bombay), having passed the requisite examination, has been admitted to the Licence in Midwifery.

The Services.

DEATHS IN THE SERVICES.

LIEUT.-COLONEL ARTHUR WILLAN DAWSON, Bengal Medical Service (retired), died at Grange Park, North London, on March 7th, aged 64. He was the son of Dr. Thomas Dawson of Liverpool, born on February 11th, 1859, and was educated at Liverpool and at King's College, London. He graduated M.B. at Durham University in 1884 and M.D. in 1892, also taking the M.R.C.S. and L.R.C.P.Lond. in 1886. He entered the I.M.S. as surgeon on April 1st, 1886, became lieutenant-colonel after twenty years' service, and retired on July 19th, 1917. He spent his whole service in military employment, and for many years was medical officer of the Sappers and Miners stationed at Kurki. He had a long record of war service: North-East Frontier of India, Chin Lushai, 1889-90, medal with clasp; North-West Frontier, Hazara, 1891, clasp; Chitral, 1895, relief of Chitral, medal with clasp; Tirah, 1897-98, actions of Dargai and of the Sampagha and Arhanga Passes, operations at and around Dwatoi, and operations in the Bara Valley, two clasps; China, 1900, medal; Tibet, 1903-4, medal; and North-West Frontier, 1908, operations in the Momand country, medal. During the recent war he was in medical charge of the Indian hospital ship *Glenart*

Castle, and was on board when she was in a collision on her first voyage, but had left her before she was finally sunk, with great loss of life, in the Bristol Channel.

Surgeon Alexander William MacLéod, R.N.(ret.), died at Great Yarmouth on April 9th. He was the elder son of the late Inspector-General William MacLeod, M.D., C.B., R.N. After taking the diplomas of L.R.C.P. and S. at Edinburgh in 1877, he entered the navy as surgeon in the same year, but retired after a few years' service in the same rank.

Obituary.

CHARLES KILLICK, M.A., M.D., B.CH.CANTAB., F.R.C.S.ENG.,

Honorary Surgeon, Royal Eye and Ear Hospital, Bradford, and Honorary Ophthalmic Surgeon, Bradford Royal Infirmary.

THE medical profession not only of Bradford but also of a much wider area has to deplore the sudden and tragic death at the age of 48 of Dr. Charles Killick. Apparently in normal health, he infected his finger while examining an ophthalmic patient and died within nine days of septicaemia. Born near Bradford, a member of a well known professional family, he received his medical education at Cambridge University. After taking his arts degree with honours in the natural science tripos, he gained a university scholarship at St. Mary's Hospital, London. His bent—ophthalmological—almost from the first led him to take up that branch of surgery, and he spent many years in Maidstone in ophthalmic practice and as honorary surgeon to the Kent County Ophthalmic Hospital. In spite of his success there he felt that Kent was not sufficiently bracing for his children, and he returned to Bradford, becoming honorary ophthalmic surgeon to the Royal Eye and Ear Hospital. He was a life member of the Société Ophthalmologique de France, a member of the council of the Ophthalmic Section of the Royal Society of Medicine, a member of the Ophthalmological Society of Great Britain, and a member of the Bradford Division of the British Medical Association. He was a frequent contributor to the medical journals; his chief hobby, indeed, was the translation of French and other foreign ophthalmic works. He greatly preferred literary and scientific studies to outdoor recreation. Of recent years he became interested in freemasonry, and obtained in a very short time an astonishing mastery of its ritual. His geniality and mental alertness as well as his great medical abilities made him universally popular in Bradford, and his early death is a severe loss to the profession. Great sympathy is felt for his widow and young children.

Medical News.

AN Emeritus lecture will be delivered at the Middlesex Hospital Medical School by Sir John Bland-Sutton, LL.D., on Tuesday, June 5th, at 3 p.m.

MEMBERS of the Association who desire to take part in the discussions to be held in the Section of Diseases of Children of the Annual Meeting of the British Medical Association at Portsmouth next July are requested to communicate with Dr. R. Hamer Hodges, 93, Victoria Road North, Southsea. On Thursday, July 26th, the discussion will be on acidosis and alkalosis in children, and on Friday, July 27th, summer diarrhoea will be discussed.

THE annual dinner of the Federation of Medical and Allied Services will be held at the Langham Hotel, Portland Place, W.1, on Tuesday, May 29th, at 7.15 p.m., and not on May 23rd as previously announced. Sir Berkeley Moynihan, the president, will preside, and the chief guest will be the Right Hon. Neville Chamberlain, Minister of Health.

DR. C. K. CLARKE of Toronto will deliver the Maudsley lecture before the Medico-Psychological Association of Great Britain and Ireland in the Barnes Hall of the Royal Society of Medicine on Thursday, May 24th, at 3 p.m. Dr. Clarke will be entertained to dinner on the same evening. The quarterly meeting of the Society will be held at 11, Chandos Street, W.1, at 2.30 p.m. on the same day.

IT is hoped that the Duke of York will be able to lay the corner stone of the new Nurses' Home of the Liverpool Royal Infirmary on July 25th.

AT a meeting of the Medico-Legal Society on Tuesday next, May 15th, at the house of the Medical Society of London, a discussion on the Mental Treatment Bill, 1923, will be opened by Mr. A. H. Trevor, B.A. The chair will be taken at 8.30 p.m.

THE Infants' Hospital, Vincent Square, Westminster, has arranged a course of lectures, to be delivered by members of the medical staff during May and June at 8.45 p.m., on the diseases and treatment of infants. The first lecture of the series will be given by Dr. Eric Pritchard on Tuesday, May 15th, on the principles of infant feeding, and the second by Dr. Helen Mackay, on the treatment of nutritional disorders in infancy, on Wednesday, May 23rd.

WHEN the proposal was first made by the Inchcape Retrenchment Committee a couple of months ago we pointed out the strong objections there were to the abolition of the appointment of Public Health Commissioner with the Government of India. The *Times* correspondent, in a telegram from Simla on May 6th, states that the proposal has been abandoned.

DR. RUSSELL JOHN REYNOLDS has been appointed Honorary Adviser in Radiology to the Ministry of Pensions.

THE summer dinner of the Glasgow University Club, London, is to be held at the Trocadero on Friday, June 1st, at 7.30 p.m., when the Lord Rector, the Earl of Birkenhead, will preside. Any Glasgow University men who, though not members of the club, would like to attend, are invited to communicate as early as possible with the honorary secretaries, 1, Harley Place, N.W.1.

THE Ministry of Pensions announces that meetings of the Standing Joint Committee for Ex-Service Questions were held on April 27th. At the meeting of the Other Ranks Panel over which Major G. C. Tryon, M.P., Minister of Pensions, presided, it was stated that the special institution provided in the south of England for the separate treatment of insane ex-service men was now occupied by 50 patients and the number would shortly be doubled. The patients had been chosen from amongst those in county and borough asylums. Of one hundred relatives approached on the matter nearly half objected to the transfer of patients to a distance, being satisfied with the treatment given in their own county and borough asylums. Representatives of the British Legion expressed appreciation of the efforts made by the Ministry of Pensions to obtain separate treatment. Other subjects brought before the meeting included service disability awards, the care of motherless children, parents' need pensions, and repairs to artificial limbs.

A NEW course of post-graduate lectures free to medical practitioners commenced on May 3rd at the Hospital for Sick Children, Great Ormond Street, W.C.1, and will be continued on succeeding Thursdays at 4 p.m. up till and including July 12th.

THE Ministry of Health has issued a list (London: H.M. Stationery Office, price 3d.) of approved sanatoriums and other residential institutions for the treatment of persons suffering from tuberculosis and resident in England and Wales, with the names of the administrative counties and county boroughs in which the institutions are situated and the date on which approval expires.

DR. W. M. FRAZER and Dr. I. D. EVANS of Gray's Inn were called to the Bar on April 25th.

DR. G. M. THOMPSON, on the occasion of his retiring from the post of medical officer of Bellaghy dispensary district, which he had held for forty years, has been presented with an Overland Sedan car and an illuminated album containing the names of 700 subscribers. Mrs. Thompson was on the same occasion presented with a silver salver.

THE Southend Doctors' Cricket Club has a vacant date on Wednesday, August 1st, 1923. They will be very glad to arrange a match on that day against a team of doctors, and to entertain the players and their friends to tea after the game. Any doctor interested is asked to communicate with the Honorary Secretary, Dr. A. W. Holthusen, 583, London Road, Westcliff-on-Sea.

A LECTURE on the psychology of epilepsy will be given at the house of the Royal Society of Medicine on Thursday, May 24th, at 5.15 p.m., by Dr. E. D. Wiersma, professor of psychiatry and neurology in the University of Groningen. The chair will be taken by Dr. Robert H. Cole, physician for mental diseases to St. Mary's Hospital. The lecture is one of the course in advanced psychiatry organized by the University of London. Admission is free without ticket.

THE house and library of the Royal Society of Medicine will be closed from Saturday, May 19th, to Monday, May 21st, both days inclusive.

THE Ingleby lectures before the University of Birmingham will be delivered by Dr. Harold Black on May 30th and June 6th at 4 p.m.; the subject selected is the investigation of the alimentary tract by *x* rays. Members of the medical profession are invited to attend.

WE mentioned a few weeks ago that the Section of Oto-Laryngology of the Swedish Society of Physicians had invited some representatives from this country to visit Stockholm and to take part in certain meetings there. The British party is to arrive in Stockholm on the morning of Friday, May 18th, and will be entertained by Professor and Mrs. Holmgren in the evening. On the following morning Professor G. Forssell will give a demonstration at the Radium Institute, and in the afternoon there will be a meeting in the rooms of the Swedish Society of Medicine, when papers will be read by Dr. Logan Turner, Dr. Brown Kelly, Dr. de Kleyn, Professor Bárány, and others. In the evening the Section for Otology will entertain the foreign guests at dinner. On May 20th the party will pay a visit to Upsala, and on the following day will go sightseeing in Stockholm. On the evening of May 22nd there will be a final meeting at the house of the Society of Medicine, when papers will be read by Sir StClair Thomson, Professor H. Burger and Dr. Arthur Cheatle.

THE third annual congress of German oto-rhino-laryngologists will be held at Kissingen next week (May 17th to 19th), when the following subjects will be discussed: (1) Operations on the accessory sinusus, introduced by Hajek of Vienna, Halle of Berlin, and Manasse of Würzburg; (2) treatment of chronic tonsillitis, introduced by Dietrich of Cologne, Kummel of Heidelberg, and Schlemmer of Vienna.

THE Fourth International Neurological Congress will be held at La Salpêtrière in Paris on June 8th and 9th, when the subject for discussion will be compression of the spinal cord. The pathological anatomy and pathogenesis will be dealt with by Sir James Purves-Stewart and Dr. George Riddoch of London, and the pathological physiology, clinical symptoms, and treatment by Dr. C. Foix of Paris. Further information can be obtained from the General Secretary, Dr. H. Meige, 35, Rue de Grenelle, Paris.

THE Dutch Orthopaedic Society will celebrate its twenty-fifth anniversary in the hall of the University at Amsterdam on May 25th and 26th, under the presidency of Dr. Murk Jansen, when addresses will be delivered by Sir Robert Jones, Professor Adolf Lorenz, Dr. Albee, Dr. Calot, Dr. Spitzky, and Dr. Putti.

THE Cairo correspondent of the *Daily Telegraph* states that during the last week in April one hundred cases of plague were reported for the whole of Egypt. No cases were reported at Cairo; in Alexandria there was one case, and in Port Said two. The situation is reported to be more or less normal except at Girga and Assiout, where the infection is spreading. The disease is chiefly of the bubonic type.

THE seventh All-Russian Congress of Bacteriology, Epidemiology, and Public Health will, it is announced, be held at Moscow from May 22nd to 28th, when the following subjects will be discussed: (1) Immunity, serotherapy, vaccine therapy, chemotherapy, and diagnosis; (2) bacteriology and epidemiology of the prevalent infectious diseases in Russia; (3) disinfection and destruction of rats and insects; (4) organization.

THE total receipts of the United Hospital Fund of New York for the year ending June 30th, 1922, amounted, according to the annual report, to 585,557 dollars, as compared with 710,773 dollars in the previous year. In 1919-20 and 1920-21 there were "high pressure" hospital campaigns; the receipts in 1918-19 amounted to 221,535 dollars only, but this was the highest amount received down to that time. At the annual distribution of funds a sum of 525,000 dollars was allotted in amounts varying from 37,000 dollars to 1,000 dollars among 56 hospitals, comprising 18 general hospitals, 10 hospitals for women and children (including maternity hospitals), 11 special hospitals (including orthopaedic, eye, ear and throat, skin and cancer, and neurological hospitals), 6 hospitals for convalescents and chronic cases, and 11 hospitals in Brooklyn. The United Hospital Fund of New York was organized in 1879, and the receipts for the year 1879-80 were 26,455 dollars, distributed among 19 hospitals. All hospitals sharing in the fund are required to submit an annual statement on a uniform form showing in detail the work, income, and expenses for the preceding year. Any hospital in Greater New York may become a member of the United Hospital Fund after recommendation by a committee on admissions as to its equipment and management, and election by the Board of Trustees, provided that it is duly incorporated, has had for three years at least thirty-five ward beds, and has given during the same period not less than 5,000 days of free service each year.

IN the six Swiss universities there are at present 1,451 medical students, of whom 187 are women; among them are 281 foreigners, including 49 women.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediocra, Westrand, London;* telephone, 2630, Gerrard.

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

"N." asks if any reader can suggest a successful remedy for black tongue.

WHOOPING-COUGH.

DR. THOMAS CARRUTHERS (Kilbarchan, Renfrewshire) writes to point out that Dr. Midelton's note of April 28th (p. 746) contains no statement as to the period in the disease at which the treatment was begun; the whoop may go on for a long time by a sort of habit spasm. Dr. Carruthers adds that in a disease so variable both in duration and intensity "controls" are necessary.

INCOME TAX.

"ANTHONY" took over a practice on March 31st, 1921. The inspector of taxes asserts that his predecessor's figures for past profits of the practice appear to have been inaccurate, and that as the correct figures cannot be ascertained he proposes that the practice shall be assessed for 1921-22 and 1922-23 on the first accounts of the new proprietors for the period to March 31st, 1923.

*** If, as seems to be clearly the case, "Anthony's" predecessor was doing badly, the inspector's proposal is unfair, as its adoption would deprive our correspondent of the benefit of the three years' average to which he is legally entitled. The impracticability of showing what were the past profits is, of course, a serious difficulty, but assuming that it can be shown that for specific causes the 1921-1923 earnings of the practice were greater than the 1918-1921 profits, it ought to be possible to come to some arrangement with the inspector to agree on an assessment on the three years' average basis, which would be less than the 1921-23 profits, though perhaps greater than the amount first claimed. Failing such agreement, the matter might be dealt with by the Commissioners on a personal appeal from the assessment when made; if all the ascertainable facts were put before them, they would, no doubt, give a decision which would be a reasonable compromise between the two figures at present in the field.

"A. B." holds an appointment under a local authority from whom he receives a rate per mile to cover all running expenses, repairs, depreciation of his car. When he renewed his car he found that the mileage allowance has not been sufficient to recoup him for the loss of capital value of his old car. Can he claim any special allowance from income tax?

*** He is entitled to allowance of expenses incurred wholly exclusively and necessarily in the performance of his duties. It may be that some of the expenses charged in "A. B.'s" car account might have to be reduced on account of private as distinct from official use of his car, but, apart from that, there is a difficulty arising over the introduction into the Statute of the word necessary. The local authority by which "A. B." is employed presumably decided on the rate per mile as sufficient for the type of car "necessary" for the work, and "A. B." may very well be open to attack—as regards any special claim—that the loss arises through his use of a car which was superior to

that "necessary," in power, type, or accommodation. One or two of "A. B.'s" figures—that is, the "purchase price of car £570" and "selling price £225"—differ from those in his covering statement, but the above considerations apply in any case.

"J. S." has to live in a house by virtue of his appointment as M.O. to a charity; he may not sublet it and must give it up on relinquishing his appointment; he has to pay for the internal repairs of the house but not for the rates.

*** On the facts the charity appears to be the statutory occupier of the premises, and the annual value forms no part of the "income" of "J. S.," inasmuch as the benefit of residence is not convertible into money (Tennant *v.* Smith).

LETTERS, NOTES, ETC.

The Unpleasant Taste of Potassium Bromide.

DR. S. P. CASTELL (London, N.6) writes to suggest that the difficulty about the taste of potassium bromide can be avoided by using sodium bromide, the taste of which is the same as that of common salt. Thirty grains in a cup of meat extract, he says, is scarcely detected. Dr. Castell adds that a patient who persistently refused potassium iodide in various disguises took sodium iodide without any suspicion.

De Morgan's Spots and Malignancy.

DR. GEO. A. PEMBERTON WRIGHT (Southampton) writes: Recently, on examining a man suffering from bronchitis, I noticed some twenty of the reddish or crimson raised spots known as De Morgan spots scattered all over the skin of the chest, with four fairly large ones within a radius of 1 inch from the region of the ensiform cartilage. I have noticed many cases before, but never so many spots on one man. In most of the cases noticed (over fifty in number) the spots have been single, rarely two or three together, and the sites have been in order of frequency: (1) Area of ensiform cartilage. (2) In the nipple line, mostly within a radius of a couple of inches or so from the nipple itself. (3) Near the umbilicus. I have not noticed them in other parts of the body. We were taught that these spots were related in some way with malignant disease and were found generally on persons suffering from such maladies. Of the cases that I have noticed, only one—a woman, aged 56 years—suffered from malignant disease. She had cancer of the stomach and one De Morgan spot near the left nipple. The last case I have noticed—the man with twenty spots on his chest—is very healthy excepting the temporary bronchitis. It seems unlikely that there really can be any connexion at all between the appearance of these spots and malignant disease. There must be some other explanation, and I should be very interested to hear it.

Serum by the Mouth.

DR. T. M. ALLISON (Newcastle-on-Tyne) writes: Some time ago in the BRITISH MEDICAL JOURNAL there were recorded some laboratory experiments made at Cambridge on guinea-pigs, throwing doubt on the efficacy of antidiphtheria serum when administered by the mouth. The method in human beings in my experience during the last thirty years has given excellent results, and the following letter from a practitioner in East Kew, Victoria, Australia, is interesting as confirming that experience.

"Dear Sir,—With reference to your letter in the BRITISH MEDICAL JOURNAL of November 18th last, it might be of interest to you to know of another Australian experience. Some years ago I was in a health resort in the mountains near Melbourne, and as an epidemic of diphtheria broke out it became necessary to stamp out the outbreak. I considered the plan of swabbing all the school children, but thought I would try a clean sweep as the easiest and possibly the most effective method, and this took the form of the administration of antidiphtheria serum by the mouth. In all about one hundred and seventy State school children and about fifty convent school children were treated. The children were given about one thousand units each of the antidiphtheria serum by the mouth from a small china egg-cup; about one dozen egg-cups were used, and sterilized by boiling after each batch of one dozen children received their dose of the serum. Each child was told to sip the serum and hold it underneath the tongue for a minute or more before swallowing it. The local action on the mouth, throat, and tonsils may have been the chief factor, but after dealing with all these children in one afternoon there were no further cases of diphtheria, and no possibility of anaphylaxis if the serum had to be injected at a later date.—R. A. PARKER."

Treatment of Acne Vulgaris.

DR. M. AZER (Cairo) writes to recommend the following method for treating obstinate cases of acne vulgaris. All the cases treated were of over a year's duration and other treatments, including that by auto-vaccines, had failed. He gives an intramuscular injection of collosol manganese every fourth day, one teaspoonful of levure de bière in water before every meal, and the following lotion dabbed on the parts night and morning: Pulv. calamini ʒ iij, pulv. zinci oxidi ʒ iij, pulv. tragacanth ʒ j, sulphur ppt. ʒ ij, aq. calcis ʒ iij, aq. rosea ad ʒ viij. Dr. Azer gives a brief history of four cases: (1) A lady in whom the face, chest, and back had been affected (comedo and pustular stage) for two years; after seven injections great improvement was noticed. (2) A policeman in whom the distribution was the same; he had suffered for one year; after six intramuscular injections he recovered. (3) A student with lesions on the face in the pustular stage; he had suffered for fourteen months and improvement followed eight injections. (4) A student with lesions in the pustular and comedo stage on face, back, and chest for one year, was somewhat improved after six injections.

A Cause of Lifelong Headache.

DR. REGINALD COCK (London, E.2) writes: About two years ago a patient of mine, G., aged 74 years, wrote me the following letter:

"Dear Sir,—As I have often been under your kind treatment for my health and the bad pains and the dreadful sensations in my head through losing my hair when a child, for which there was no apparent cause whatever, not even illness—which has always been a mystery—I shall indeed feel extremely grateful if you will open my head after death, should you outlive me, whereby you, perhaps, may be able to find out the cause of my poor head being so greatly afflicted, causing me at times such acute suffering for over sixty years. As I get older it gets worse. I cannot describe what I suffer so often. I thought if it could be opened it may be a very great benefit to others who suffered like me with their heads if the cause of all my head afflictions can be found out, which you warmly approved of. I can assure you, dear Sir, it will be a very great relief to myself and relations to know and to be sure that my most urgent and last wish will be fulfilled in having my head opened after death."

My patient having died on April 14th, I carried out a *post-mortem* examination on April 16th and found the following conditions most worthy of note: (1) The hair on the scalp was very thin and scanty. (2) There was marked atheroma of the mitral, tricuspid, and aortic valves; also of the ascending arch of the aorta. (3) The under surfaces of the frontal and parietal bones were much thickened, even to the extent of half an inch in some places, and pressing downwards on the brain. The last condition was also, in my opinion, of congenital syphilitic origin and no doubt the cause of the headaches.

Constriction of the Penis in an Infant.

DR. T. WILSON AIRD (Margate) writes: The case of a feather in the parotid duct reported by Sir Dundas-Grant in the JOURNAL of March 10th, p. 416, reminds me of an unusual case which came under my care while acting as M.O. on an Atlantic liner years ago. One day I was asked to see the six-weeks old infant son of a German couple in the steerage. The mother informed me that for several days and nights the child had kept up an almost continuous murmuring cry whenever it was awake as if it was in constant pain, and that she could find no cause for this. On the child being undressed I observed that it was in a very dirty, uncared-for condition, and that the penis was deeply constricted in the middle as if a ligature had been tied round it, with the result that the distal half was swollen and inflamed to twice its normal diameter, while the proximal half appeared to be normal. With some difficulty I was able to partly separate the sides of the constriction and discovered the extremity of a hair pointing from left to right. On seizing this with dressing forceps and carefully unwinding I found it to be a human hair about 12 inches in length—presumably from the mother's head. The parents seemed as much surprised as I was. On further examination I found that the skin of the penis in its entire circumference had been completely severed down to the subcutaneous tissue, but fortunately the deeper structures had escaped. I was afraid lest the urethra had been damaged but events proved that this was not so. The child made a rapid and satisfactory recovery. I imagine that the hair had become attached to the infant's nightdress, then to the penis, and the natural imbrication of the hair set up and carried on the "encircling movement."

Correction.

IN the Contents page of the JOURNAL of May 5th the letters "F.R.S.Ed." were, through inadvertence, printed after the name of Dr. J. Argyll Campbell in place of D.Sc.Ed.

Vacancies.

NOTIFICATIONS of offices vacant in universities, medical colleges and of vacant resident and other appointments at hospitals will be found at pages 30, 31, 34, and 35 of our advertisement columns, and advertisements as to partnerships, assistantships and locumtenencies at pages 32 and 33.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *191*.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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Advertisements should be delivered, addressed to the Manager, Strand, London, W.C.2, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.